User Manual

for

Kongsberg XPA Systems

Note
We remind you that only the Esko staff, or persons having received
an appropriate training, are allowed to handle, manipulate or do repairs on the system.

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110411	jhbe	Application selection, for details, see Technical Reference manual – text added.
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120830	jhbe	Info about limitations, camera below
121019	jhbe	About XP-Guide dialogs
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121219	jhbe	Job report chapter: Job definition has been improved
130710	jhbe	Chapter about chiller fuse replacement added
131128	jhbe	Chiller error codes added
150930	jhbe	Info about bit slipping and chuck replacement added Info about new vacuum cleaner added

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1. Welcome

1.1 Introduction

Welcome to a long-lasting co-operation with Esko.

The intention of this User Manual is to provide information sufficient to:

- Understand the main principles of the XPA system.
- Learn how to operate the XPA table in order to produce the expected result.
- Learn about the XPA safety rules in order to operate the system in a safe way.

The manual is divided into the following main sections:

- Safety regulations — The main safety issues are described.
- System description — A short-form description of the system.
  This section is divided into two chapters:
  - System description.
  - Graphical User Interface (GUI). — This part is available as context sensitive help from the XP-Guide program. In addition, it is available as Appendix A in this manual.
- XPA workflow — A complete workflow is described in detail.
- How to's.. — Typical tasks are described in detail.
- Preparing for a job — What do I have to prepare before the start of a job. This is a part of the 'How to' chapter.
- Work with ARS — The Automatic Registration System is covered by a separate chapter.
- System setup — A description of all parameters to be set and how to set them.
- Tooling system — A complete description of the XP tooling system.
- Maintenance — What maintenance is required in a short and long term.
- Appendices

1.2 Document style

Name or style	Description
Pop-up dialog	This is the dialog that appears when you click the Right mouse button.
Start button	The italic style indicates this is a button on the Operator panel.
OK	The bold style indicates this is a button or function in the XP-Guide user interface.
Options->System Option	Menu selection: From the Options menu, select System Option
(123)	123 is the page number where the actual function is described. It is also a hyperlink; a mouse-click on the number will bring you directly to the issue.

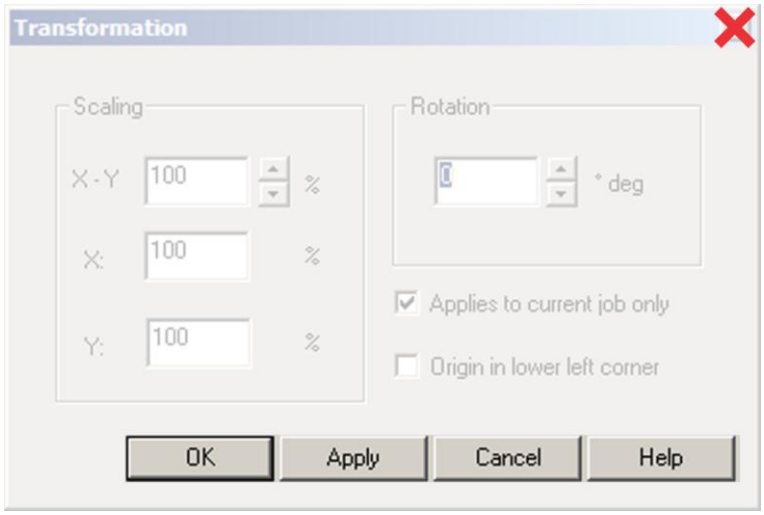
1.3 XPA and XP as names in this manual

Roughly said, XPA is a system made up of an XP cutting table with an addition of In-stack and Out-stack.
To simplify this documentation, the name XP is used for all issues related to the cutting table, while XPA is used as the name of the complete system.

1.4 Local languages

This manual is available in a wide range of local languages. When the document is translated into a local language, the screen pictures, some illustrations and the content in the Appendices remains in English language.

1.5 About XP-Guide dialogs



To exit from any XP-Guide dialog, use the control buttons available.
Using the cross in upper right corner is not recommended and the consequence is un-predictable.

2. Safety regulations

2.1 Introduction

The Kongsberg table is designed to conform to safety regulation standards.
Nevertheless, operating the table can involve hazards if the operator does not follow the operating instructions or uses the table for non-intended purposes.
The safety regulations described below are supplemented with safety warnings in the respective topics.

2.2 Responsibilities

2.2.1 The manufacturer

The manufacturer is responsible for delivering the system according to safety regulation standards.

2.2.2 The customer

The customer is responsible for:

- Ensuring that the system is used for it's intended use only
- Allowing that only authorized and trained personnel operate the system
- Preventive maintenance as described in Maintenance.
- The local regulations regarding installation and operation are fulfilled.

2.2.3 The operators

The operators are responsible for:

- Operating the system only when it is in a flawless state.
- Ensuring that no unauthorized persons come close to the system.

2.3 Requirements to be met by operators

The personnel operating the system must:

- Be adequately trained.
- Have read and understood the instructions described in "Safety regulation" as well as any other safety warnings.

2.4 Definition of use

The intended use is described in the 'Work flow…' and 'How to..' chapters. Any other use is considered non-intended use.

Examples of non-intended use:

- Operation by operators not meeting the requirements as described above.
- Unauthorized modifications (bridging safety devices, removing covers etc.)
- Utilizing accessories other than those specified by Esko.

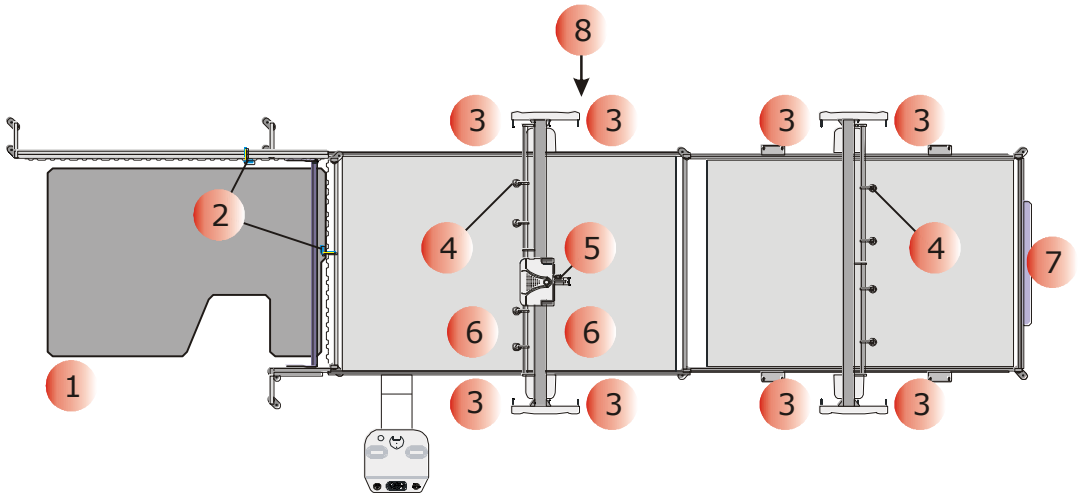
Non-intended use may cause:

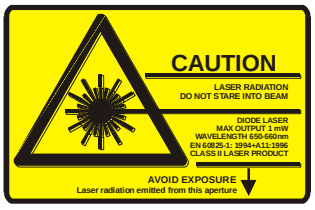
- Health hazards and injuries.
- Damage to the system.
- Incorrect functionality.
- Damage to work materials.

Esko is not liable for any damage resulting from such non-intended use.

2.5 Danger zones

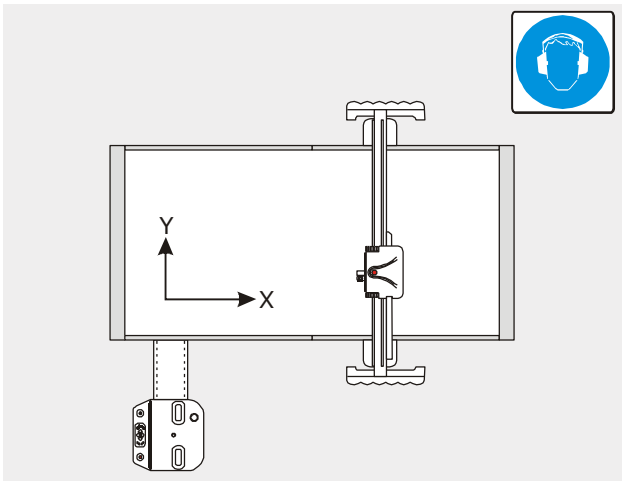
2.5.1 Moving parts, laser radiation and high voltage



1		No person beneath the In-stack lift table.
2		Remote start without warning. Crushing risk.
3		Stay away from moving parts.
4		Crushing risk.
5		Laser radiation.
6		Stay away from traverse and tool heads.
7		No person beneath the Out-stack lift table.

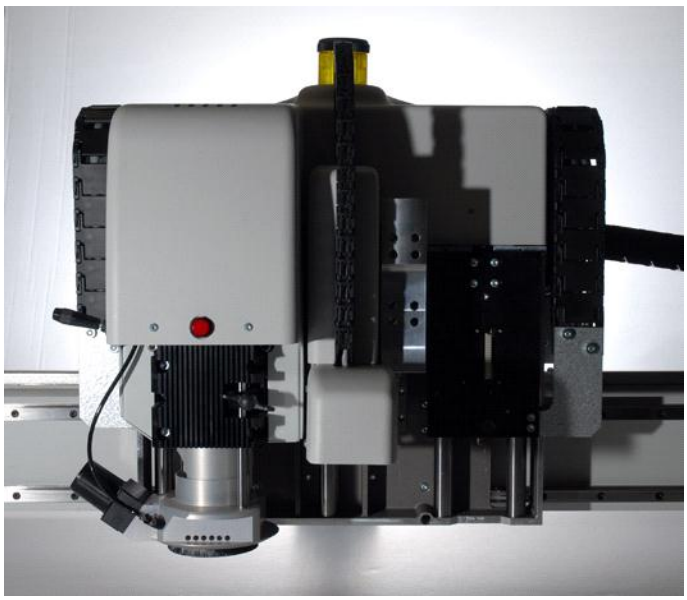
8		MPU cabinet

2.5.2 Noise level



Hearing protection should be used by any personnel exposed to the noise from the XP table.

2.5.3 Ejection of parts



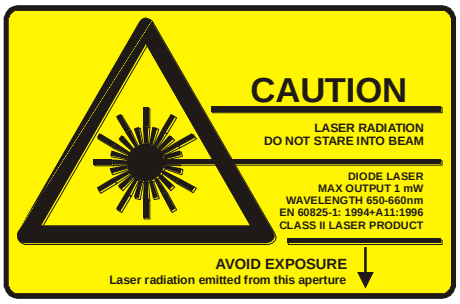
Potential risk when running the HSMU/HPMU:

Personnel hit by breaking milling bit or small pieces of processed material.

Eye protection should be used by any personnel working with HSMU/HPMU on XPA.

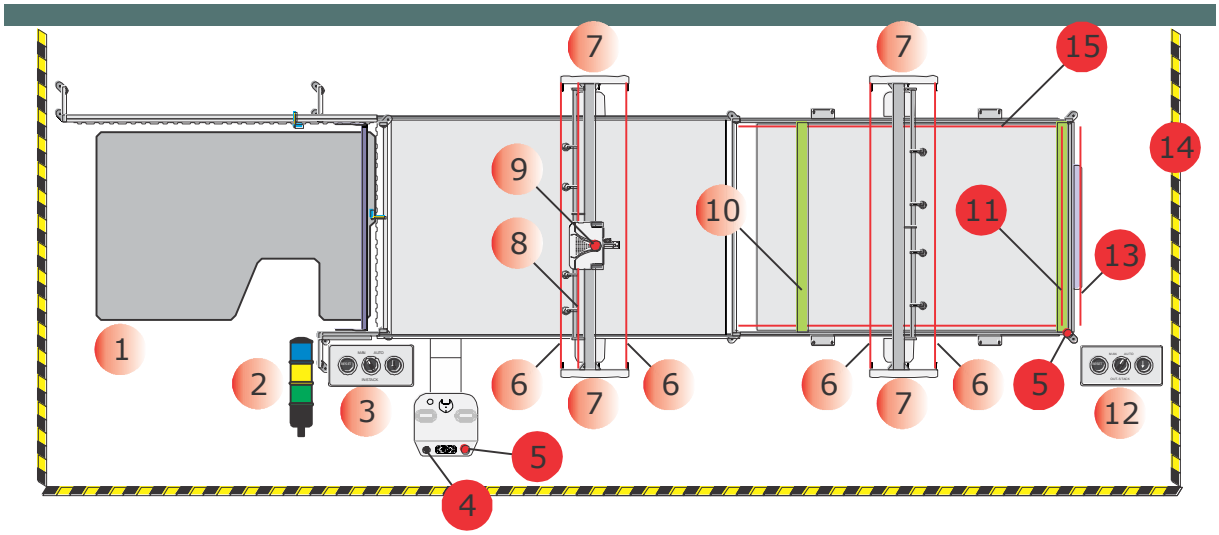
2.6 Warning sign explanation

	Knife blades are extremely sharp. Used in this documentation to indicate operations with knife blades and milling bits.
	Hanging load. Do not enter.
	Squeezing risk.
	This unit will start without warning.
	Potential areas with a risk of being squeezed are marked with the 'do not touch' sign. These areas are: • Between Y carriage and rack • When the Y carriage moves towards traverse ends. • Between the table top and the moving traverse. • Underneath the tool head.
	The Hearing Protection symbol indicates areas where the use of hearing protection is compulsory.
	The Eye Protection symbol indicates areas where the use of eye protection is compulsory.

	Potential areas with a risk of being hit by moving parts are marked with the 'Moving Parts' sign. These areas are: • Both traverse ends. • Y carriage. • Tool head(s).
	The main power unit contains main voltage and may only be opened by authorized personnel. The main power unit is marked with the 'voltage' warning sign.
	Laser radiation. The tool head is equipped with a class II laser pointer. Avoid laser light into your eyes.

2.7 Safety devices

2.7.1 Overview

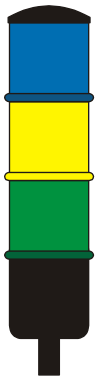


1	In-stack lift table safety switch
2	System status lamp
3	Main safety reset button.
4	The Main power on/off switch
5	Emergency stop
6	Photo cell protection of traverse beam and tools
7	Traverse collision supervision
8	Squeeze danger protection
9	Safety status lamp
10	Safety switch, movable beam Out-stack
11	Photo cell safety, fixed beam Out-stack
12	Out-stack safety reset
13	Photo cell safety, Out-stack entrance
14	Yellow / black tape on the floor to indicate attention area
15	Photo cell safety, Out-stack lift table

2.7.2 In-stack lift table safety switch

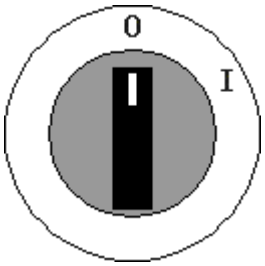
For details, see (23).

2.7.3 The System status lamp



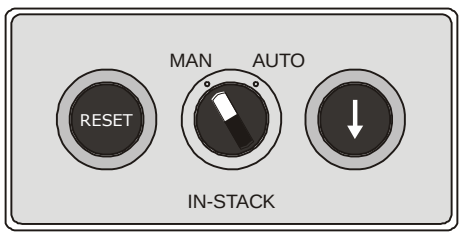
For details, see (30).

2.7.4 The Main power on/off switch



For details, see (29).

2.7.5 The Main safety reset button

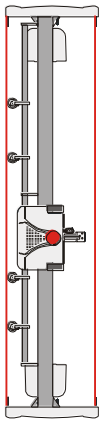


For details, see (23).

2.7.6 Emergency stop

For details, see (29).

2.7.7 Photo cell protection of traverse beam and tools



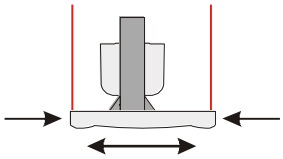
DynaGuard Safety System
The Photocell safety system consists of two light beams in front of the traverse and two behind. In addition, there is a stop mechanism mounted on each end of the traverse.
Machine movement will stop and servo power will be switched off if:

- One of the light beams is broken.
- The stop mechanism is activated, for instance when a person is standing too near the table.

To continue operation after the Safety system has been activated, do:

- Reset the Safety system by pressing Stop on Operators panel
- Press Start to continue operation

2.7.8 Traverse collision supervision



If the safety cover is actuated, servo power is switched off and the movement stops.

2.7.9 Squeeze danger protection

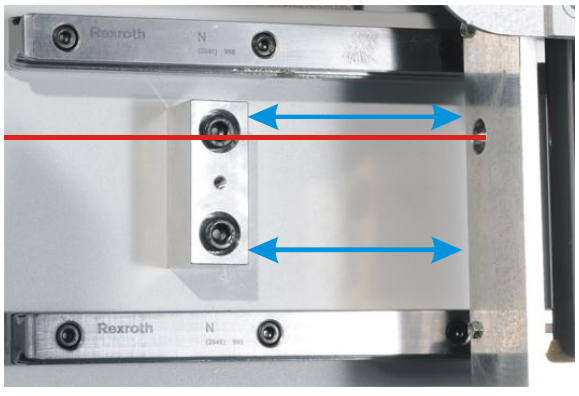
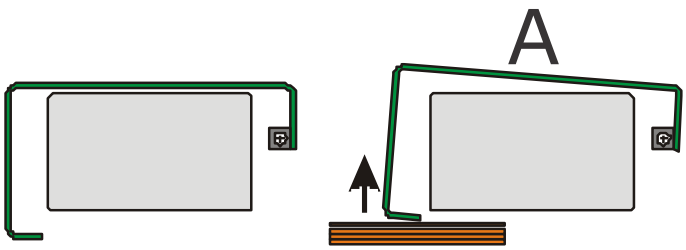


Photo cell supervision for the Y-axis end stopper.

2.7.10 Safety status lamp

For details, see (30).

2.7.11 Safety switch, movable beam Out-stack



A – error condition detected.

Supervision to avoid movable traverse being damaged.

2.7.12 Photo cell safety, fixed beam Out-stack

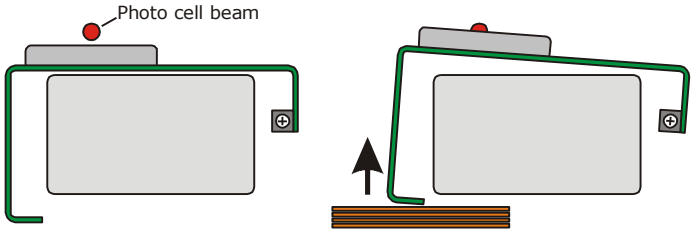
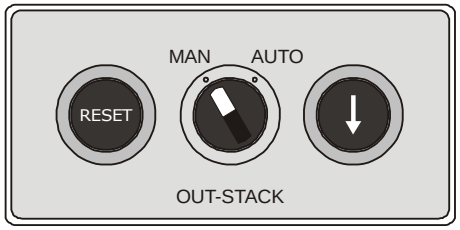


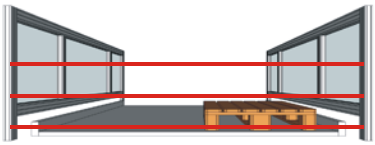
Photo cell supervision for the fixed Out-stack beam.

2.7.13 Out-stack safety reset



For details, see (26).

2.7.14 Photo cell safety, Out-stack entrance



Inhibit anyone from entering the Out-stack lift table area.

Avoid squeeze / shearing risk.

2.7.15 Yellow / black tape on the floor to indicate attention area

The yellow / black tape indicates the warning area. This area is restricted to operators and other trained personnel.

2.7.16 Photo cell safety, Out-stack lift table

Avoid squeeze / shearing risk between the Out-stack lift table and the frame.

2.8 Protective equipment

For the operator(s), Esko recommends the following protective equipment:

Close-fitting clothes to avoid being caught by the beam or the tool head which can cause injuries.

Gloves to protect against cuts from materials with sharp edges

Eye protection should be used by any personnel working with HSMU/HPMU on XPA.

Always use hearing protection when working with the machine for a longer period of time.

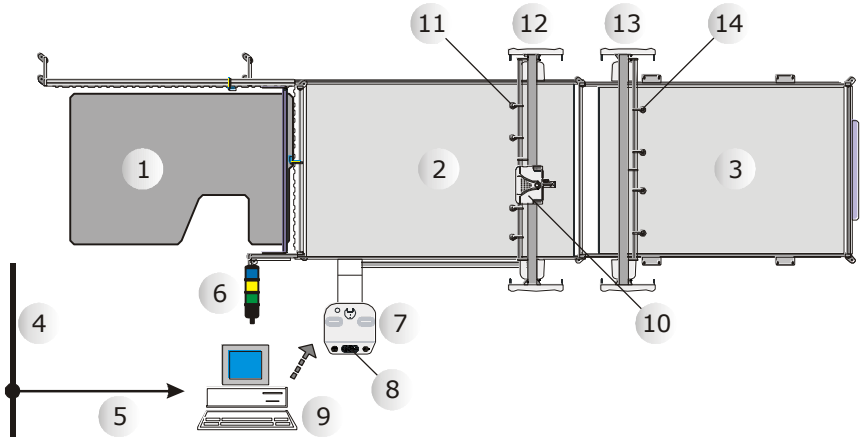
The acoustic noise level will vary with the type of operation and tooling, but a typical average level is 78.5 – 83.5 dBA and a maximum level of 98.5 dBA.

2.9 Procedures in case of malfunctions

Trouble-shooting and repair shall only be executed by authorized personnel.
Contact the Esko Service Organization.

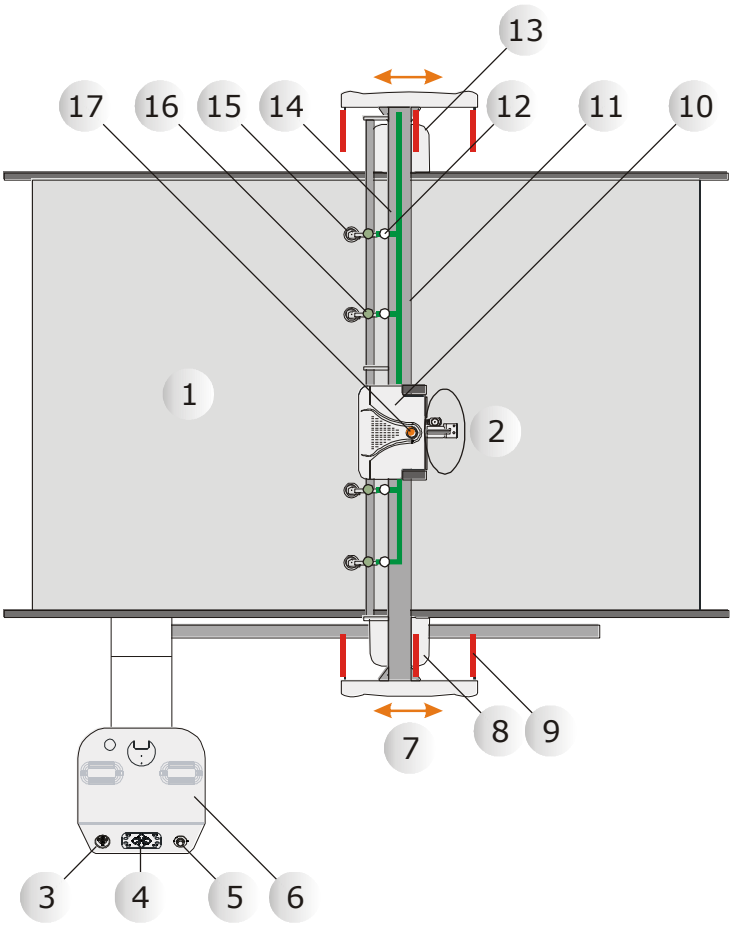
3. System description

3.1 XPA, general structure



1	In-stack
2	XP cutting table
3	Out-stack
4	Network connection
5	Input file; ACM, hpgl, dxf, ard, ddes, cf2
6	System status lamp
7	Operator stand
8	Operator panel
9	Front end PC
10	Y carriage
11	Load cups
12	XP traverse
13	Unload traverse
14	Unload cups
15	

3.2 XP cutting table, naming conventions



1	XP cutting table
2	XP tooling
3	Power on/off switch
4	Operator panel
5	Emergency stop button
6	Operator stand
7	Collision supervision (traverse safety stop)
8	X1 carriage
9	Photo cell safety, XP traverse
10	Y carriage
11	XP traverse
12	Load cups on/off
13	X2 carriage
14	XP traverse
15	Load cups
16	Load cup position lock
17	Safety status lamp
18	

3.3 In-stack

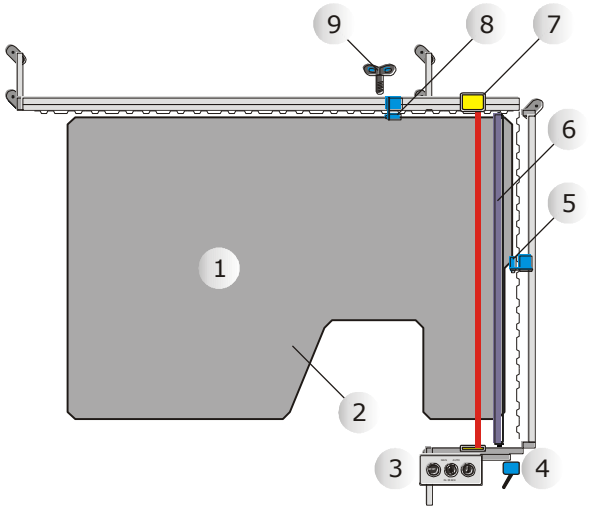
3.3.1 General

The In-stack is based upon a complete Lift-table system where the material to be processed is stored before it is picked up by the **Load cups**.

3.3.2 Specification

	Metric	**Imperial**
The maximum allowed In-stack load is	1000 kg	2200 lb
The maximum allowed weight of one sheet is	20 kg	44 lb
The maximum allowed material weight is	3 kg/m^2	0.6 lb/sq ft

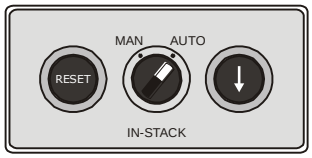
3.3.3 Naming convention



1	In-stack
2	Load table
3	In-stack control panel
4	Stacker Y position lock
5	Stacker Y
6	Pressure roll
7	In-stack top level sensor
8	Stacker X
9	Stacker X position lock
10	
11	

3.3.4 In-stack control panel

Switch positions:



	Automatic – this is the switch position during normal operation.
AUTO	The top of the material stack is kept at a constant level. The In-stack lift table is moved up as sheets are removed from the stack.
	Manual - this is the switch position during material load.
MAN	When the switch is in this position, the In-stack load table can be lowered by pressing the In-stack down button.
RESET	Safety reset for the complete XPA system.

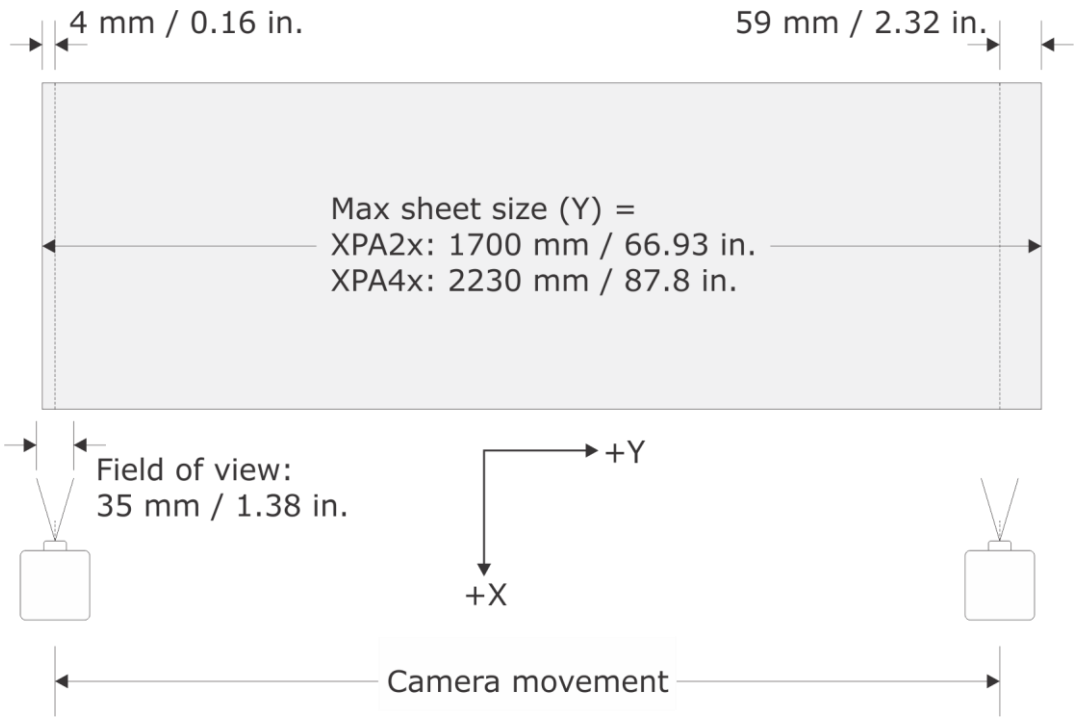
3.3.5 In-stack lift table

The In-stack lift table is equipped with a safety switch.
If the safety switch is activated, any down movement will stop.

To continue after safety stop:

- Remove any obstructions.
- Switch XPA Main power off and on again.

3.3.6 Camera below, limitations



As illustrated above, the camera center is missing 63 mm / 2.48 in. to cover the entire Y sheet size.

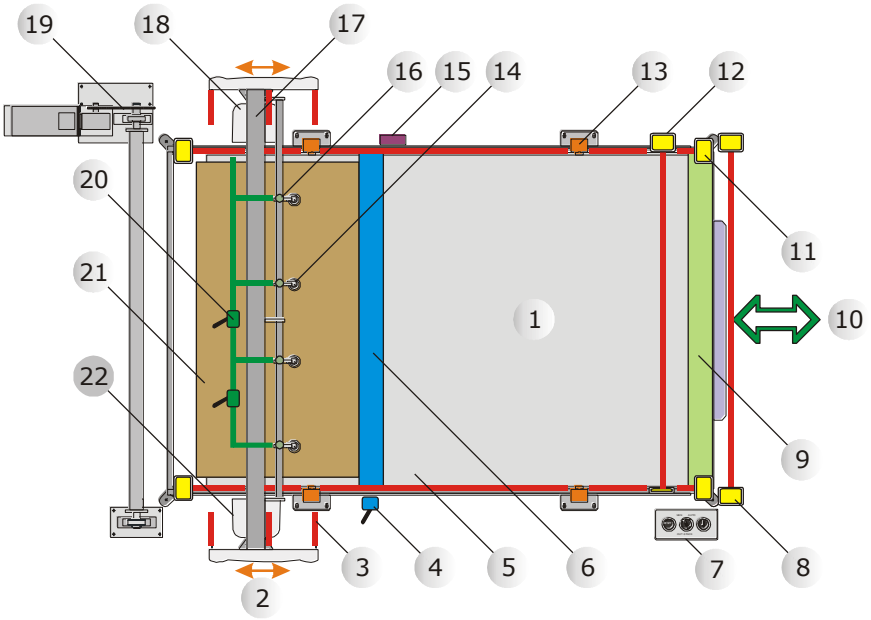
3.4 Out-stack

3.4.1 General

After job completion, the sheets are stored in the Out-stack.

Note: The maximum allowed Out-stack load is 1000 kg / 2200 lb.

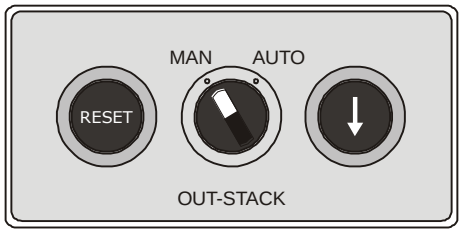
3.4.2 Naming



1	Out-stack
2	Collision supervision (traverse safety stop)
3	Photo cell safety, Unload traverse
4	Position lock, movable support beam
5	Out-stack lift table
6	Movable support beam
7	Out-stack control panel
8	Photo cell safety, Out-stack entrance
9	Fixed support beam
10	Out-stack entrance
11	Photo cell safety, Out-stack lift table
12	Out-stack top level sensor, with reflector
13	Unload table top stop supervision
14	Unload cups
15	Unload table down position sensor
16	Unload cup position lock

17	Unload traverse
18	X2 carriage, Unload traverse
19	Out-stack winch
20	Unload cup on/off
21	Flexible cover
22	X1 carriage, Unload traverse

3.4.3 Out-stack control panel



Switch positions:

AUTO Automatic – this is the switch position during normal operation.

The top of the material stack is kept at a constant level.

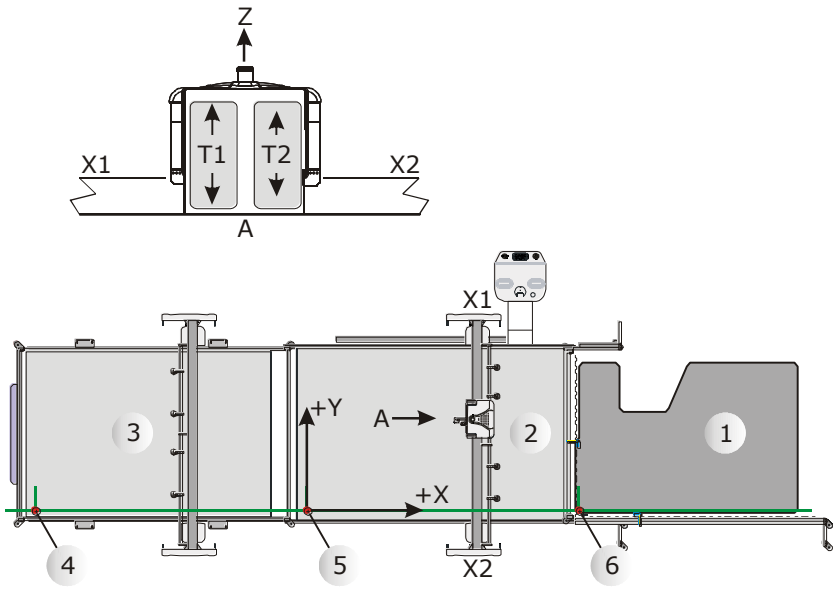
The Out-stack lift table is moved down as sheets are added to the stack.

MAN Manual - this is the switch position when unloading material.

When the switch is in this position, the Out-stack load table can be lowered by pressing the Out-stack down button.

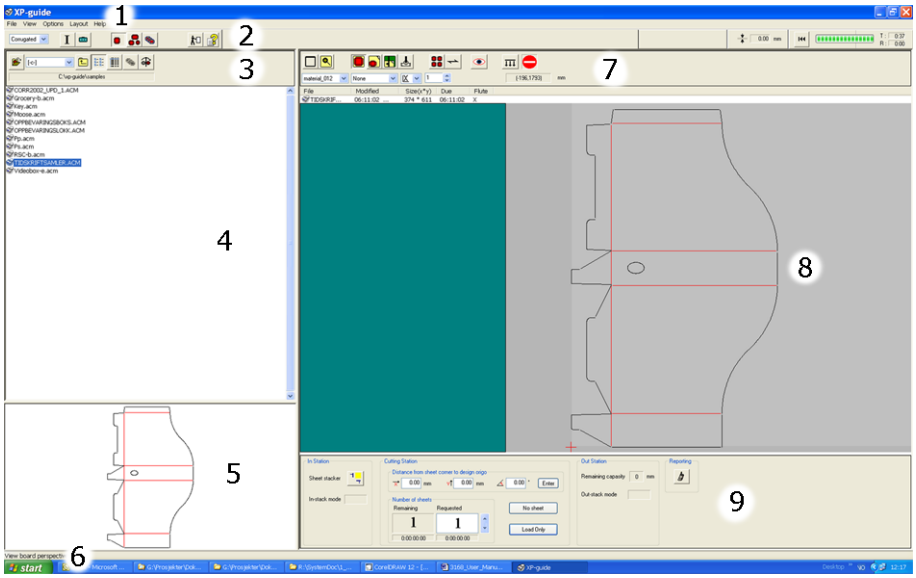
RESET Out-stack safety system reset.

3.5 Co-ordinate axes



1	In-stack
2	XP cutting table
3	Out-stack
4	Main zero point, Out-stack
5	Main zero point, XP
6	Main zero point, In-stack
T1/T2	Tool positions.
Z	Tool up/down movement. Moving up is positive.

3.6 The Graphical User Interface



The XPA Graphical User Interface (GUI) contains these main elements:

1 Main Menu (218)
2 Main Toolbar (220)
3 File View Toolbar (223)
4 File View (221)
5 Preview (222)
6 Status Bar (228)
7 Job View Toolbar (225)
8 Job View (224)
9 XPA Production Control (227)

3.7 Application programs available

After installation of XP-Guide, the following application programs are available:

XP-Guide	Control program for the XP - table
SysLoadMPC	Program for download of updates to CU – modules (**Error! Reference source not found.Error! Reference source not found.Error! Bookmark not defined.**).
HWT900XP	Hardware test program, see separate HWT900XPA User Manual.
FaceMill	A program for face milling. Prepared for HSMU/HPMU (189).
FaceCut	A program for simple cut out of squares. Prepared for knife or milling (189).

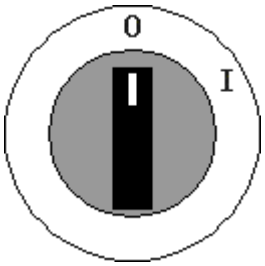
3.8 Operating elements

The table is equipped with the following operating elements:

- Main power switch
- Emergency stop switch
- Operators Panel (31)
- In-stack control panel (23)
- Out-stack control panel (26)

3.8.1 Main power switch

On XPA, the Main power switch is located on the Table Control Station.

	**Switch positions**	**Description**
	0	The main power to the machine is switched OFF.
	I	The main power to the machine is switched ON.

3.8.2 Emergency stop switch

On XPA, the Emergency stop switch is located on the Table Control Station.

	Switch positions	**Description**
	UP	The system is ready to run.
	DOWN	The safety system is disabled and the servo power to all motors is off.

Note: Activating the emergency stop button does not provide a guarantee against injury!
Due to the high kinetic energy of moving parts do not underestimate stopping distances of traverse, Y carriage and tool head.

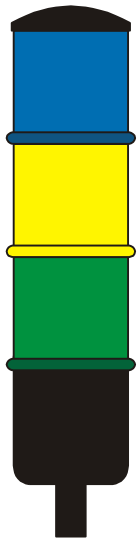
3.8.3 Safety Status Lamp

The safety status lamp (on the top of the Y-carriage) shall work in the same way for XPA system as for an XP system. The only difference is that the lamp is applicable also for the Unload traverse. The lamp has the following states:

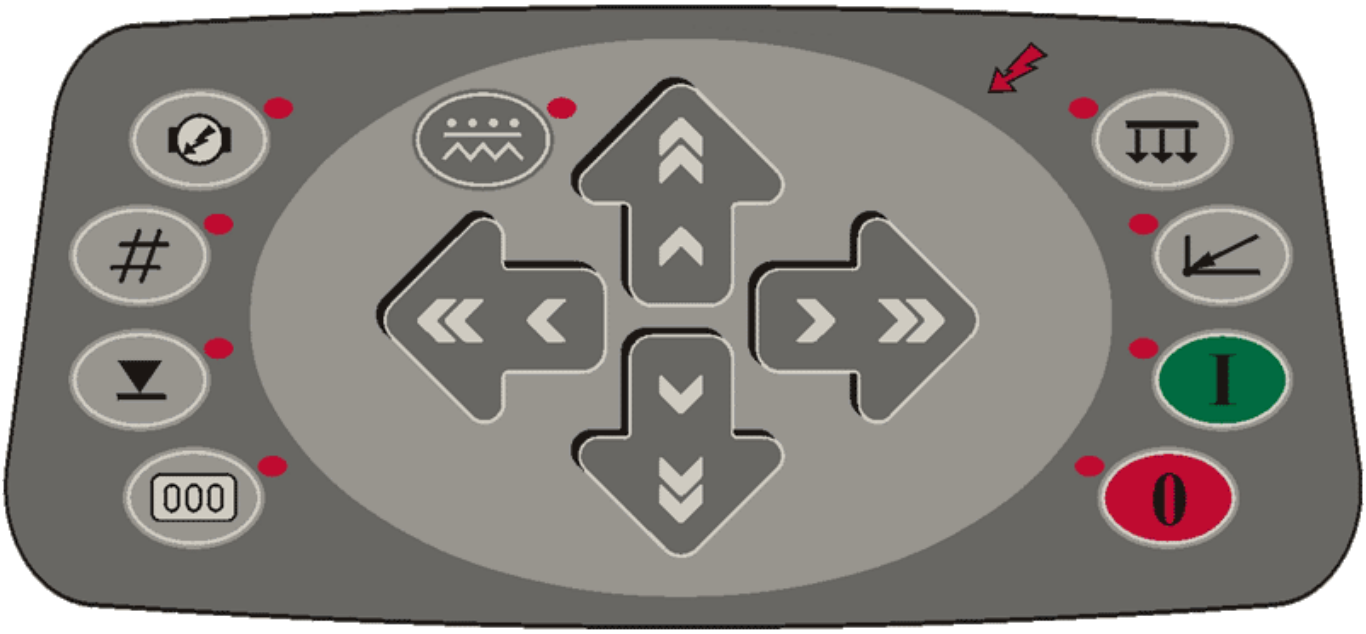
	Light	**Description**
	Off	Servo power is off
	On	Servo power is on and safety system is enabled. System is operative.
	Flashing	The safety system is activated. Reset safety system to continue operation.

3.8.4 System Status Lamp

The system status lamp is a three color light tower showing the system status as described here:

	Light	**Status**	**Description**
	Blue	Off	
		Slow flashing	Out Stack door is open or Out Stack safety reset switch not activated.
		Rapid flashing	Tool broken situation. The tool height check on the measuring station detected and error situation.
		On	A faulty situation on one of the stations.
	Yellow	Off	
		Slow flashing	The safety system is broken.
		Rapid flashing	
		On	Indicates that there is a GUI message to the operator.
	Green	Off	
		Slow flashing	
		Rapid flashing	
		On	Indicates proper operation and the system is executing.

3.9 Operators panel, XP



3.9.1 Power on

Lit when Main power is on

3.9.2 Start button

Press this button to start operation.

3.9.3 Stop button

Press this button to stop operation.

3.9.4 Vacuum On/Off button

Press this button to switch Vacuum On/Off.

3.9.5 Init Button

Press this button to:

- Initialize the system, i.e. give variables pre-set values.
- Set Reference Point.

If Fixed Reference Point is disabled, the current position of the Laser Pointer is set as the new Reference Point.

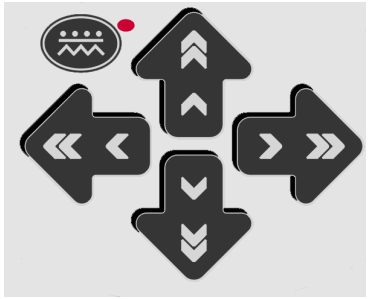
3.9.6 Table Zero

Press this button, then the Start button, to move the tool head to Zero Reference Point, which corresponds to origin in the Coordinate System. The Table Zero Mode is automatically selected at Start-Up. The button remains lit until the Zero Position is reached.

3.9.7 Servo On/Off

Press this button to switch the Servo on/off. The servo power is on when the lamp is lit.

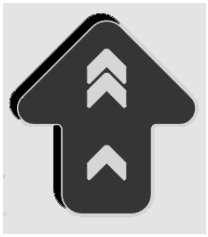
3.9.8 Jog buttons



Press the Jog buttons to move the tool head in the desired direction. The system must be in Stop mode, i.e. the Stop button must be lit, for these buttons to be operative.

Note: It is possible to configure the jog direction, see Option, System setup.

3.9.9 Continuous Jog

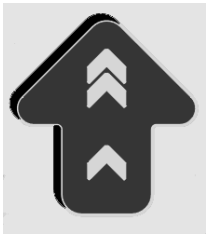


Press a Jog button to manually move the tool head with constant speed.
The X and Y Jog buttons can be operated both individually and simultaneously.

Press the single arrow for low jog speed.
Press both symbols for medium jog speed.

3.9.10 Incremental Jog

Press this button to select the Incremental jog mode.
Press the button a second time to disable the Incremental jog mode.



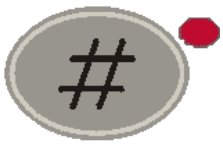
Press the two arrows to move the tool head a large step.
Press the single arrow to move the tool head a small step.

The size of the incremental movement can be changed from Option-> System setup.

3.9.11 Tool Down

Press this Tool Down button to manually operate the machine with a tool in the down position.
Cancel by pressing Tool Down a second time.

3.9.12 Vacuum release mode

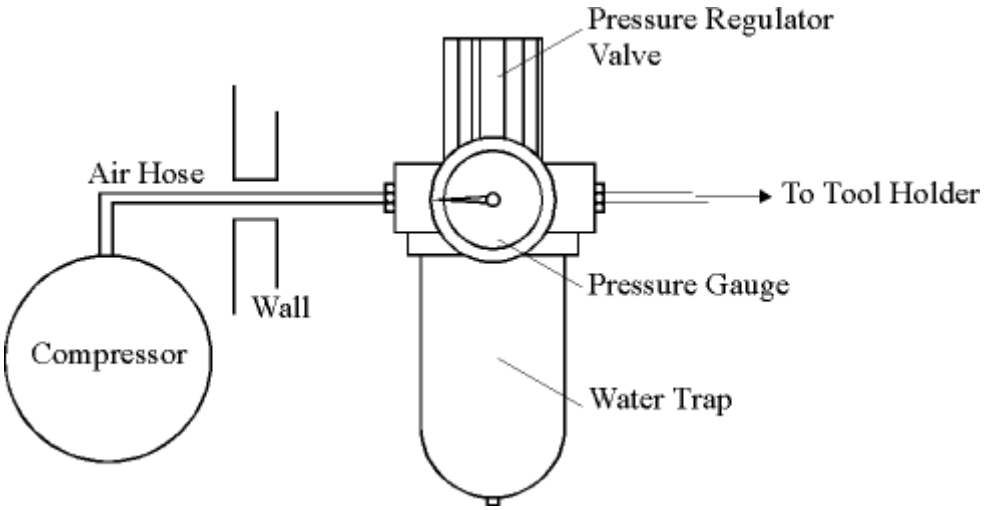


For details about this function, see separate chapter 'Vacuum control' (129).

3.10 High pressure air system

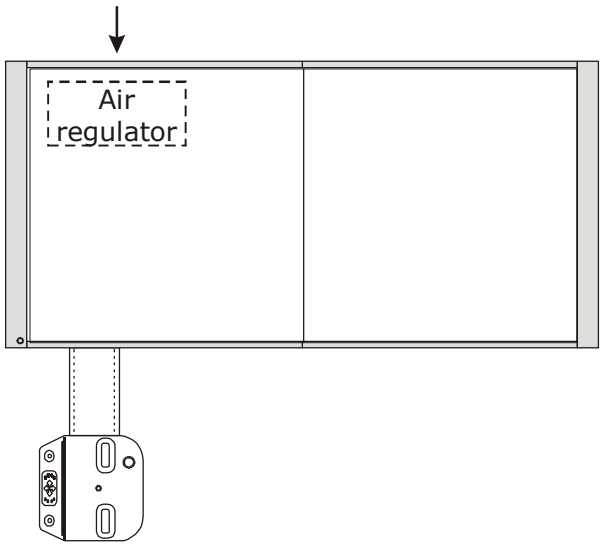
3.10.1 General

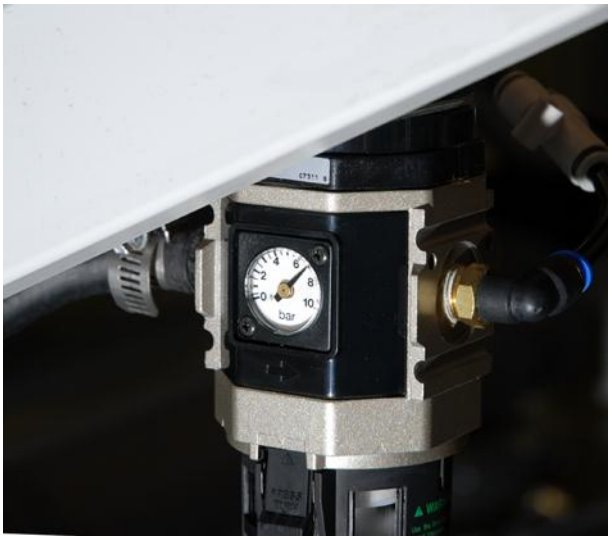
The High Pressure Air System supplies the valves and tooling with compressed air.



For details regarding air supply requirements, see 'Site Preparation manual'.

3.10.2 Air regulator settings

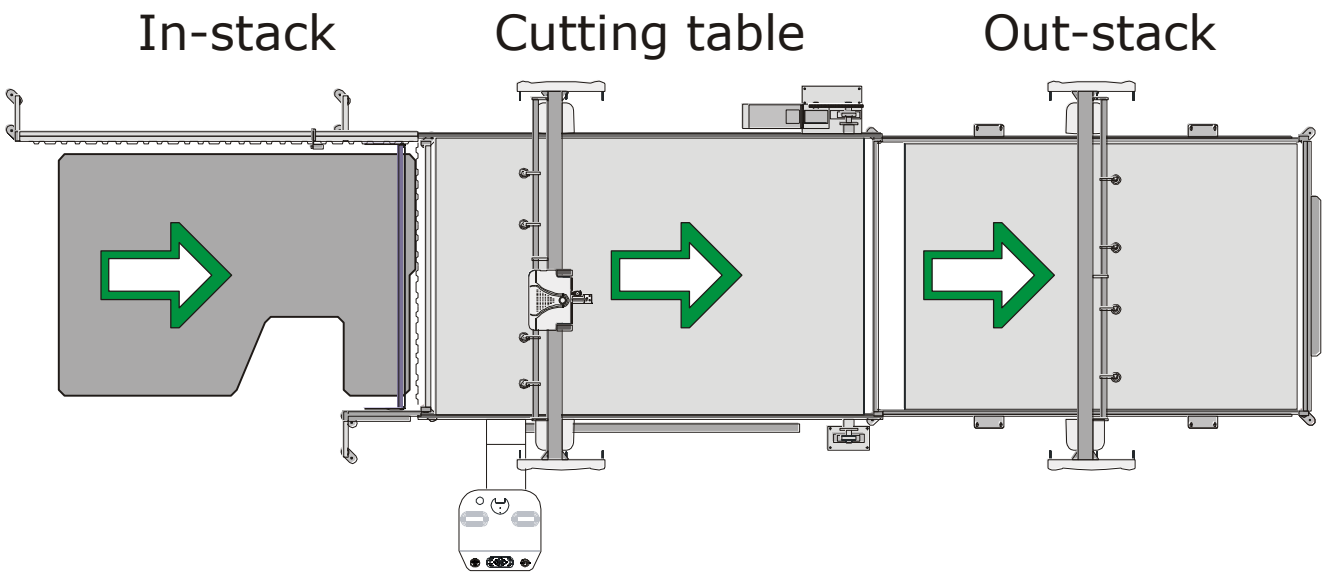




The compressed air is connected to a combined pressure regulator valve/water trap.
The air pressure should be adjusted to minimum 6 bar (6 kg/cm^2, 6*10^5 Pa). Recommended pressure level is 7 bar (7 kg/cm^2, 7*10^5 Pa).

4. XPA workflow

4.1 Modes of operation



The following modes of operation are available:

4.1.1 Automatic mode

Automatic mode is selected when **Main toolbar->Manual load** is disabled.

The **XPA Production Control** dialog is displayed (227).

This is the automatic sequence:
Note: In the chapter 'XPA automatic operation', each step is described in detail (37).

1	Configure In-stack and Out-stack according to the actual sheet of material.
2	Ensure that the In-stack is filled..
3	Select Input file, update actual XP-Guide parameters and press *Start*.
4	Sheets are automatically fetched from the In-stack and moved onto the Cutting table.
5	On the Cutting table, the job is executed.
6	When the job is completed, the sheet is moved out into the Out-stack.
7	When the Out-stack is filled with completed materials, the operator must replace the full pallet with an empty one.
8	The sequence is repeated from step 4.
	The automatic sequence continues until: • In-stack is empty. • Out-stack is full. • The number of sheets specified has been processed. • Stop is pressed.

4.1.2 Manual load/unload

Main toolbar->Manual load is enabled.

The **XPA Production Control** dialog is removed.

The manual load sequence is as follows:
Note: In the chapter 'XPA manual load operation', each step is described in detail (45).

1	The operator has to place the material to be cut correctly onto the Cutting table.
2	Select Input file, update actual parameters and press *Start*.
3	When the job is completed, manually remove the finished sheet from the cutting table.
4	The sequence is repeated from step 1.

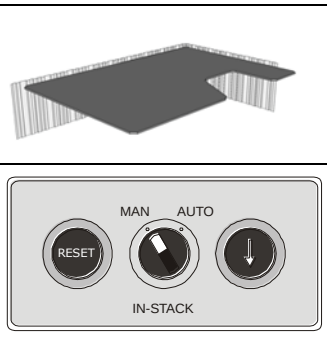
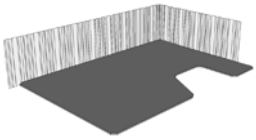
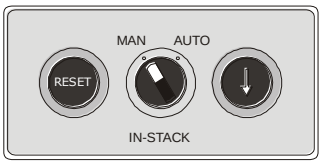
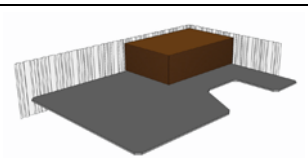
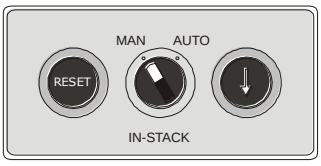
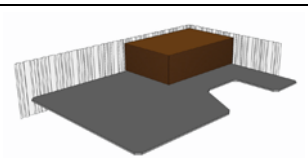
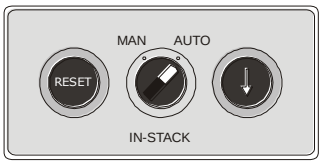
4.2 XPA automatic operation

The purpose of this chapter is to provide a guide through the steps necessary to prepare and run an XPA job properly.
Complete the steps in this sequence:

4.2.1 In-stack job preparation

4.2.1.1 In-stack material load

This operation can be carried out independent from any Cutting table or Out-stack execution:

1	2	3	4
	 	 	 
In-stack is empty and the table is in up position. Set the switch to MAN.	Press the **Down** – pushbutton to move the In-stack table down.	Load material into In-stack. Align material to the walls.	Set the switch to AUTO. The In-stack table will move up until the correct top level is reached.

4.2.1.2 Stackers

Position the Stackers correctly relative to the actual material (136).

4.2.1.3 Load cup position

Position the Load cups correctly relative to the actual material (137).

4.2.1.4 Load cup on/off

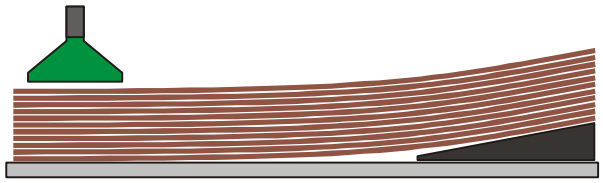
Load cups positioned outside any sheet of material should be closed (137).

4.2.1.5 In-stack pressure roll

Consider if the pressure roll is required and if the pressure is correct (138).

4.2.1.6 Sheet separation

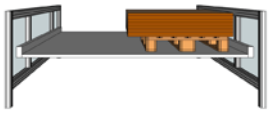
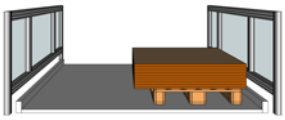
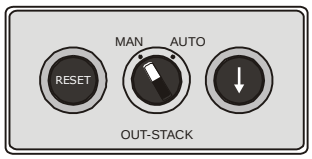
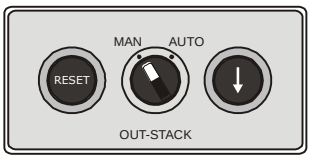
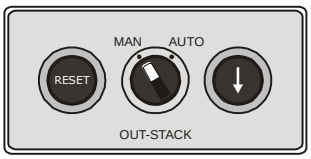
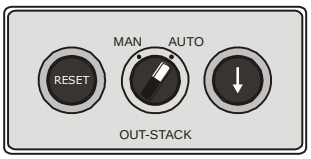
If you experience that In-stack sheet separation fails, there are different ways for improvement:

1	In-stack sheet separation functions	See Automation options (107): • Middle cups up delay • Shake at up movement • Lower In-stack table before lifting sheet • Air knife on.
2	Warped boards	 Boards that are too warped can be a problem. Inserting wedges from the rear side as illustrated might help.
3	Sheets containing cuts	Avoid using sheets of material with knife cuts in the area where the load cups will fetch when moving sheets out from the In-stack. There is a risk this will be treated as if the vacuum level is wrong.
4	Last sheet	There is a risk the last sheet follows the second last sheet. To avoid this problem, always re-fill In-stack before it is empty.

4.2.2 Out-stack job preparation

4.2.2.1 Material unload

This operation can be carried out independent from any Cutting table or In-stack execution:

1	2	3	4
			
			
Out-stack is full / you want to unload. Set the switch to MAN.	Press the **Down** – pushbutton to move the Out-stack table down.	Remove the stack of material from the Out-stack. Insert an empty pallet.	Reset safety system (RESET). Set the switch to AUTO. The Out-stack table will move up until the correct top level is reached, ready for automatic operation.

4.2.2.2 Out-stack lift table

To simplify material handling, a pallet should be placed on the Out-stack lift table.
In order to distribute the load, we recommend a pallet position as shown at right:

4.2.2.3 Unload cup selection switch

Decide if 2 or 4 unload suction cups should be active (141).

4.2.2.4 Unload cup position

Position the Unload cups correctly relative to the actual material (141).

4.2.2.5 Movable Out-stack beam

Position the Movable Out-stack beam correctly relative to the actual material (143).

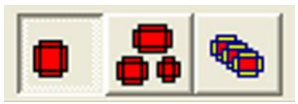
4.2.3 XP cutting table job preparation

1	Ensure that current tooling is correct for the job.
2	Ensure that all tools are sharp and correctly adjusted.
3	Ensure the table top is clean and free from obstructions.
4	

4.2.4 XP-Guide job preparation

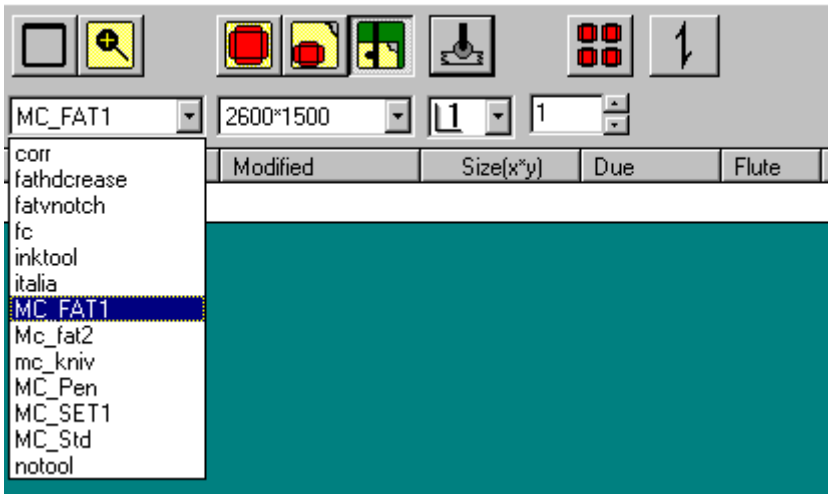
Depending upon the actual job, you have to decide which parameters are relevant for you:

4.2.4.1 Job Layout / Input mode



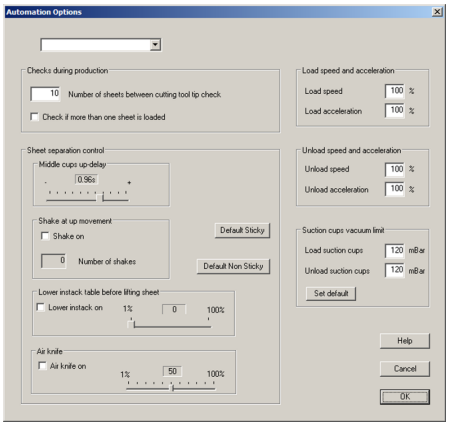
Select Single / Multi - design layout (113) or Queue input mode (110).

4.2.4.2 Job Setup



Select **Job Setup** file from the **Job Setup** drop down list (100).

4.2.4.3 Automation options

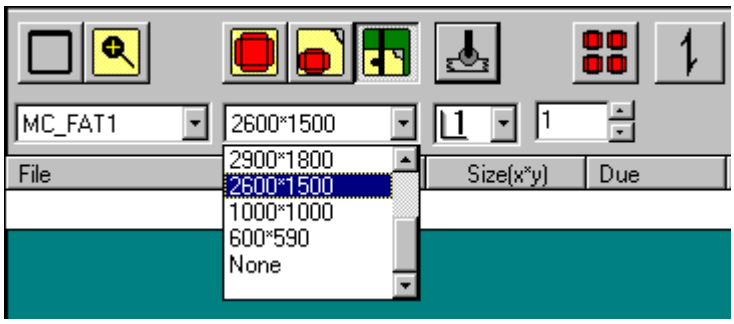


Automation options (107):

- Number of sheets between cutting tool tip measure
- Check if more than one sheet is loaded
- In-stack sheet separation functions: Middle cups up delay, Shake at up movement,

  Lower In-stack table before lifting sheet, Air knife on.
- Load speed and acceleration.
- Unload speed and acceleration.

4.2.4.4 Board size



Select **Board Size** from the **Board Size** drop down list (123).

Note: Board size information is used for calculating **Step & Repeat**. If Step & Repeat is not used, this setup is optional.

4.2.4.5 Open Input file(s)

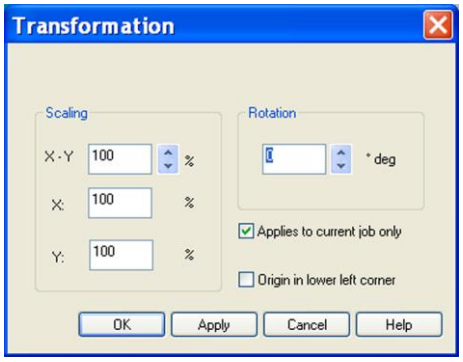
If Single design layout - select one input file.

If Multi design layout - select one or more input files.

If Queue input - select one input file to be placed at the end of the Queue.

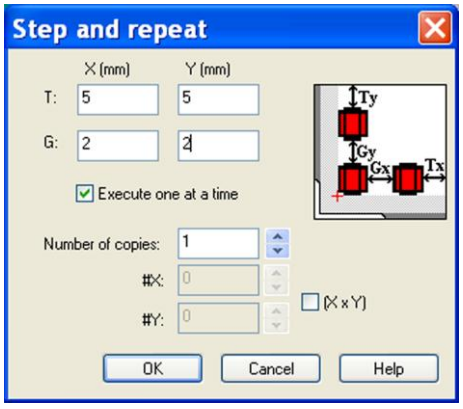
For details, see (109).

4.2.4.6 Transformation



Scale or rotation (124).

4.2.4.7 Step and Repeat



Specify multiple copies of current job (126).

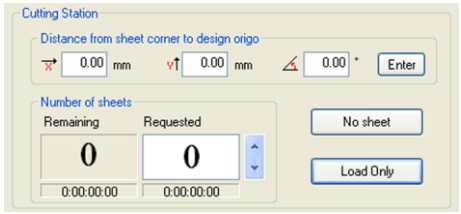
4.2.4.8 Set flute direction

Use the **Toggle Flute Direction** button to set correct direction for the actual job (123).

4.2.4.9 Vacuum sections

From the **Vacuum Section** setup – dialog, configure a suitable vacuum area for the job (129).

4.2.4.10 Production control dialog



Go to the Production control dialog (227) and check for proper settings of:

- Design position relative to sheet edge
- Number of sheets to be processed.
- Mode of operation:
  - No sheet / Sheet on table
  - Load only

4.2.4.11 Select proper speed

The machine speed during execution will have important impact on the final result.
For some combinations of tools and materials, you can run with full speed, for other combinations, the speed and/or the acceleration has to be reduced.
For this purpose, the following alternatives are available:

- Select between **High Quality**, **Normal** or **High Speed** mode (97).
- Reduce the overall acceleration (90).
- Reduce the speed and acceleration for the **Job setup** line (102)

4.2.5 Execute

Keep away from moving parts during operation.

Do not lean on racks, guide ways or traverse during operation as this may cause personal injury.
Before starting operation, make sure that:

- ***the table is free from obstructions***
- ***no unauthorized personnel come close to the table***

1	Reset safety system
2	Press *Start*
3	
4	

4.3 XPA manual load operation

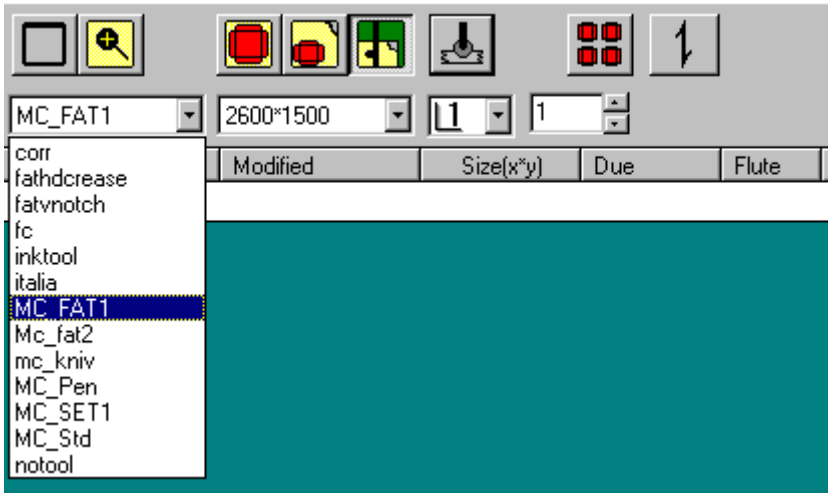
The purpose of this chapter is to provide a guide through the steps necessary to prepare and run a manual load job properly.

Use this chapter as a check – list when changing from one job to another.

During Manual load, the Unload traverse is parked in the Out-stack position and no automatic load / unload functions are carried out.

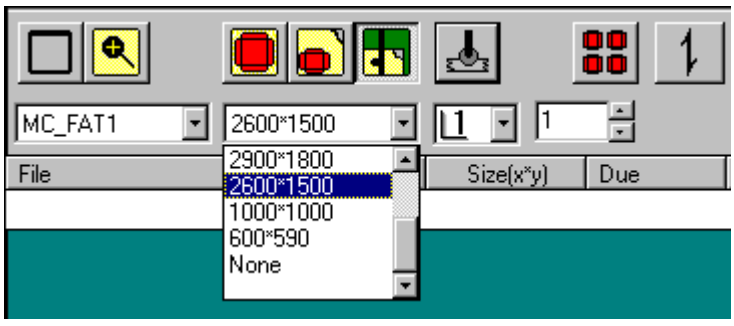
XPA acts as a Sample maker – materials has to be loaded and unloaded manually.

4.3.1 Job Setup



Select **Job Setup** file from the **Job Setup** drop down list (100).

4.3.2 Board Setup



Position the material for the job on the table.

Select **Board Size** from the **Board Size** drop down list (123).

Note: Board size information is used for calculating **Step & Repeat**. If Step & Repeat is not used, this setup is optional.

4.3.3 Open an input file

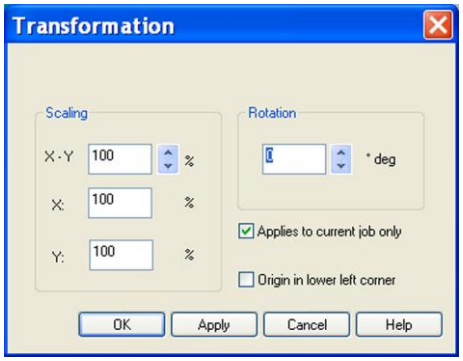
If Single design layout - select one input file.

If Multi design layout - select one or more input files.

If Queue input - select one input file to be placed at the end of the Queue.

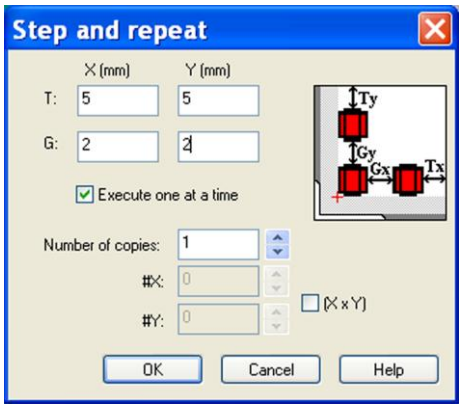
For details, see (109).

4.3.4 Transformation



Scale or rotation (124).

4.3.5 Step and Repeat



Specify multiple copies of current job (126).

4.3.6 Set flute direction

Use the **Toggle Flute Direction** button to set correct direction for the actual job (123).

4.3.7 Vacuum Section Setup

From the **Vacuum Section** setup – dialog, configure a suitable vacuum area for the job (129).

4.3.8 Select proper speed

The machine speed during execution will have important impact on the final result.
For some combinations of tools and materials, you can run with full speed, for other combinations, the speed and/or the acceleration has to be reduced.
For this purpose, the following alternatives are available:

- Select between **High Quality**, **Normal** or **High Speed** mode (97).
- Reduce the overall acceleration (90).
- Reduce the speed and acceleration for the **Job setup** line (102)

4.3.9 Run the job

Keep away from moving parts during operation.

Do not lean on racks, guide ways or traverse during operation as this may cause personal injury.
Before starting operation, make sure that:
the table is free from obstructions
no personnel come close to the table

Verify that the display of the job in Job View is reasonable.

Ensure that all settings are proper.

Press Vacuum on to start the vacuum pump.

Press Start to execute the job.

5. How to procedures

5.1 Introduction

Keep away from moving parts during operation.

Do not lean on racks, guide ways or traverse during operation as this may cause personal injury.
Before starting operation, make sure that:

- ***the table is free from obstructions***
- ***no unauthorized personnel come close to the table***

All procedures for how to run the machine, except 'Power on' is based upon the following assumptions:

- The user interface is up and running.
- The actual tools are properly mounted and adjusted.

5.2 Power on sequence

Follow these steps to power up the system and get ready to work:

5.2.1 Front End PC

Switch on the PC and the monitor.

5.2.2 Table Power

Switch the table on using the *Main Power switch (29).*
Note: After power off, wait minimum 5 sec. before the system is switched on again.

5.2.3 XP-Guide

Use the mouse, double-click the icon for XP-Guide. Check that no error message indicates faulty conditions.

5.2.4 Safety system

Reset the Safety system by pressing the *Stop* pushbutton two times.

5.2.5 Servo Power

Press the *Servo on* pushbutton. The Warning lamp on top of the Y carriage should be on without flashing. The table is now ready.

5.3 Continue after safety break

5.3.1 In-stack lift table

If the safety switch on the In-stack lift table has been engaged, do as follows:

1. Remove any obstructions.
2. Switch XPA off and on again to continue.

5.3.2 XP safety system

If the XP safety system is activated, all movements on the table are stopped and the Safety status lamp on top of the Y carriage starts flashing (30).
To continue operation, proceed as follows:

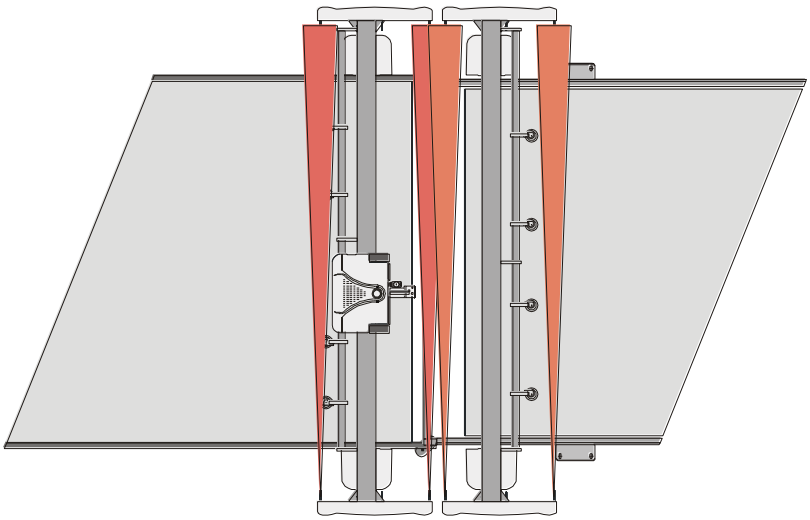
1. Ensure the table is free from obstructions and ready for operation.
2. Press the Main Reset button (see (23).

5.3.3 Out-stack safety system

If the Out-stack safety system is activated, all Out-stack movements are stopped and the blue System status lamp is slowly flashing (30).
To continue operation, proceed as follows:

1. Ensure the Out-stack is free from obstructions and ready for operation.
2. Reset the **Safety system** by pressing the *Out-stack safety reset* pushbutton (26).

5.3.4 XP traverse and Unload traverse too close



If the XP traverse and the Unload traverse comes too close to each other, the safety systems will interfere, and the machine will stop.

To continue operation, proceed as follows:

1. Manually move the traverses away from each other.
2. Ensure the table is ready for operation.
3. Press the Main Reset button (see (23).

5.4 Power Off sequence

When power off, follow this sequence:

5.4.1.1 Servo power off

Press the *Servo on* pushbutton to switch servo power off.

5.4.1.2 Table Power

Switch Table power off using the *Main Power* switch *(29)*.

5.4.1.3 Front End PC

To switch off the PC, use the Operating system shutdown procedure.

5.5 Corrugated Production

Take care:

Knife blades are extremely sharp.

Keep away from all moving parts.

Ensure all other personnel stays in a safe distance from all moving parts.

Use hearing protectors.

1. Ensure that the tool configuration is correct for the job and corresponds with the **Job Setup** information.
2. Ensure that the knife blade is sharp and proper.
3. Ensure that the **Job Setup** information is correct for the material. If not, select **Job Setup** file.
4. From **File View**, select the **Input File**.
5. Retrieve information about required sheet size from **Job View**.
6. Position a sheet of material against the left ruler. Retrieve information about the flute direction from the **Job View** window and position the material accordingly.
7. Configure vacuum zones according to the material size.
8. Switch *Vacuum on*.
9. Ensure that you run with a suitable **Program Reference point**.
10. Execute the job by pressing *Start*.
11. To repeat the job, press *Init* and repeat this procedure from point 5.

5.6 Milling Production

Take care:

Milling bits are extremely sharp.

Keep away from all moving parts.

Ensure all other personnel stays in a safe distance from all moving parts.

Use hearing protectors.

Milling jobs should be executed in High Quality mode (97).

1. Ensure that the tool configuration is correct for the job and corresponds with the **Job Setup** information.
2. Ensure that the router bit is sharp and proper for the job.
3. Ensure that the **Job Setup** information is correct for the material. If not, select **Job Setup** file.
4. From **File View**, select the **Input File**.
5. Retrieve information about required sheet size from **Job View**.
6. Position a sheet of material against the left ruler.
7. Configure vacuum zones according to the material size.
8. Switch *Vacuum on*.
9. Ensure that you run with a suitable **Program Reference point**.
10. Execute the job by pressing *Start*.
11. To repeat the job, press *Init* and repeat this procedure from point 6.

5.7 Hard board production

Take care:

Milling bits are extremely sharp.

Keep away from all moving parts.

Ensure all other personnel stays in a safe distance from all moving parts.

Use hearing protectors.

To prepare hard board materials, the procedure is as follows:

1. Mill through the top layer using HSMU/HPMU.
2. Cut through the mid-section using the HF VibraCut knife tool.
3. Mill through the bottom layer using HSMU/HPMU.

1. Ensure that the tool configuration is correct for the job and corresponds with the **Job Setup** information.
2. Ensure that the router bit is sharp and proper for the job.
3. Ensure that the knife blade is sharp and proper for the job.
4. Ensure that the **Job Setup** information is correct for the material. If not, select **Job Setup** file.
5. From **File View**, select the **Input File**.
6. Retrieve information about required sheet size from **Job View**.
7. Position a sheet of material against the left ruler.
8. Configure vacuum zones according to the material size.
9. Switch *Vacuum on*.
10. Ensure that you run with a suitable **Program Reference point**.
11. Execute the job by pressing *Start*.
12. To repeat the job, press *Init* and repeat this procedure from point 6.

5.8 Make a pen plot

Take care:

Keep away from all moving parts.

Ensure all other personnel stays in a safe distance from all moving parts.

Use hearing protectors.

12. Ensure that the tool configuration is correct for the job and corresponds with the **Job Setup** information.
13. Ensure that the Ball point pen is proper for the job.
14. Ensure that the **Job Setup** information is correct for the material. If not, select **Job Setup** file.
15. From **File View**, select the **Input File**.
16. Retrieve information about required sheet size from **Job View**.

17. Position a sheet of material against the left ruler.
18. Configure vacuum zones according to the material size.
19. Switch *Vacuum on*.
20. Ensure that you run with a suitable **Program Reference point**.
21. Execute the job by pressing *Start*.
22. To repeat the job, press *Init* and repeat this procedure from point 6.

5.9 Set the table up for multi pass creasing or milling

Take care:

Knife blades are extremely sharp.

Keep away from all moving parts.

Ensure all other personnel stays in a safe distance from all moving parts.

Use hearing protectors.

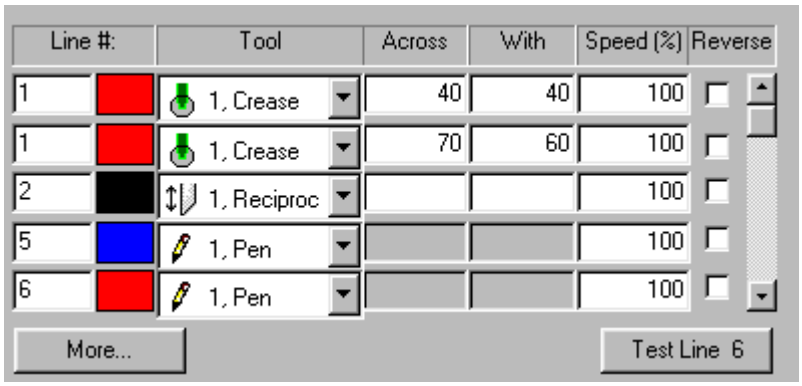
Multi pass creasing is beneficial if you want a deeper crease pattern. This is achieved by running one pass with for example 50% depth and a second pass with 70% dept.

Multi pass milling is beneficial if you want to mill through a material where the thickness is bigger than the router bit diameter.

Multi pass creasing or milling is available by modifications in the Job Setup file. Proceed as follows:

1. Open the **Job Setup** file for editing.
2. Identify the crease or milling line where multi pass is wanted.
3. Add one or more new lines with the same logical tool number and specify the same tool and desired depth.
4. When executing the job with this **Job Setup** file selected, the multi pass function will be carried out for the specified logical tool(s).
5. The multi pass lines will be executed in the same sequence as they appear in the **Job setup** dialog.

This picture shows a **Job Setup** with double pass creasing with logical tool no 1:

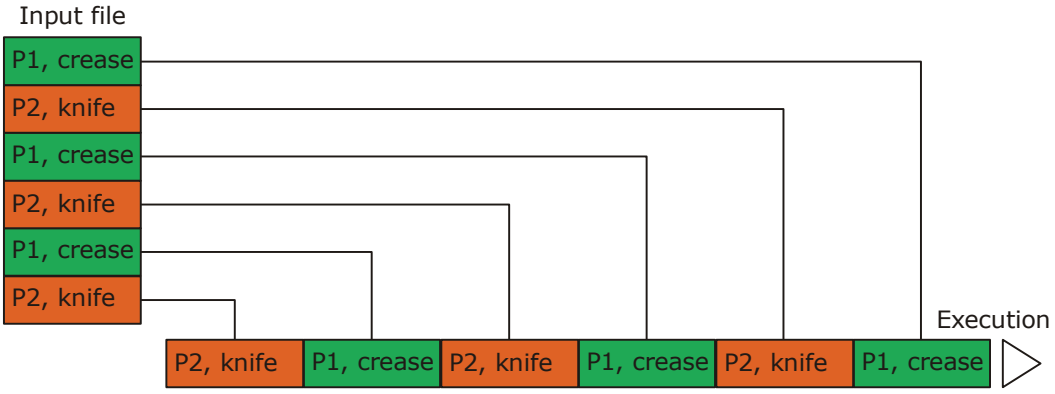


5.10 Work with different reference point settings

To define or modify reference point settings, go to the **Set Reference point** wizard (88).
Reference points are selected from the **Job View Toolbar** (225).

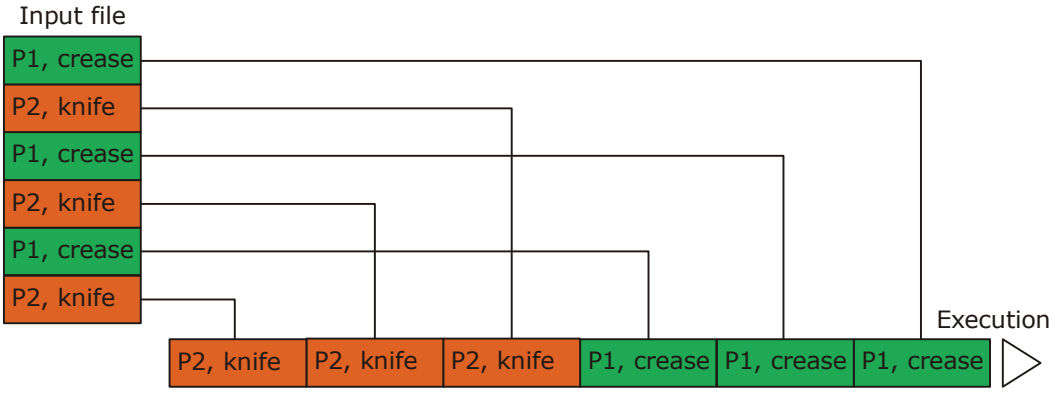
5.11 Work with Sequencing and Optimization

5.11.1 Sequencing disabled



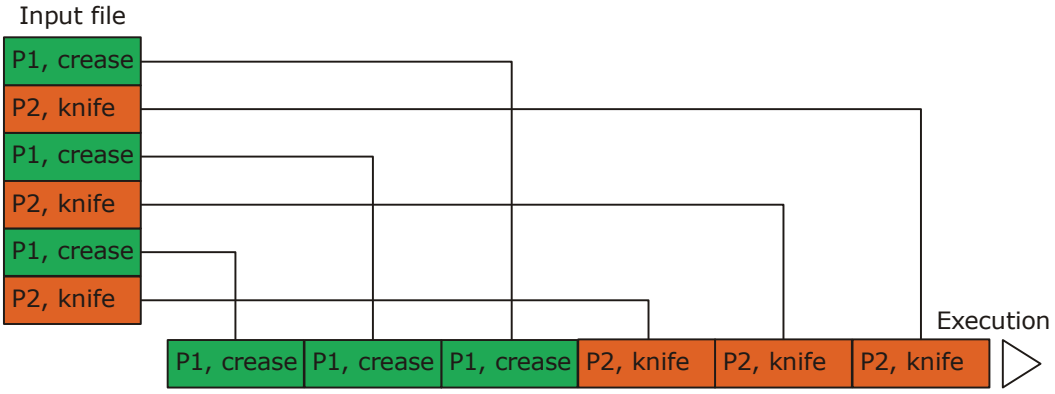
The input file is executed as is.

5.11.2 Sequencing enabled



All crease lines are executed before knife cuts. The sequence is: pen, crease, v-notch knife, milling, knife, drill.

5.11.3 Sequencing and knife before crease enabled

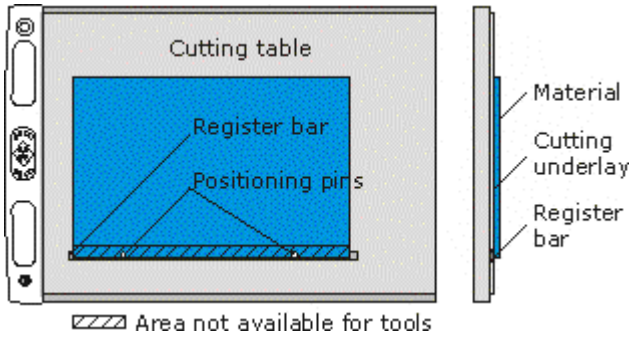


All knife cuts are executed before crease lines. The sequence is: pen, milling, knife, crease,

V-notch knife, drill.

5.12 Work with Register bar

The Register bar is an aid when the material needs registrations that fits the requirements of a specific printing press or die cutter.



On XP, the register bar is mounted along the X - axis as illustrated at left.
Register bar - Register bar fixed to the table.
Material - Sheet of material with pre-punched holes that fit the Positioning pins on the Register bar.
Positioning pins. Use these pins to fix the sheet of material in a correct position on the table. When the sheet is fixed and vacuum is switched on, you must remove the pins.
Cutting underlay - Cutting underlay.
Area not available for tools - This area is outside the working area of the machine.

5.12.1 Work flow

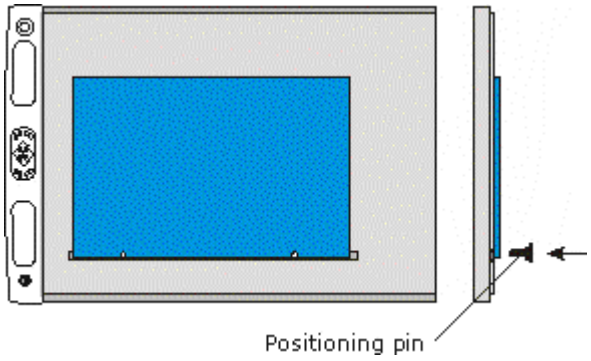
Take care:

Knife blades are extremely sharp.

Keep away from all moving parts.

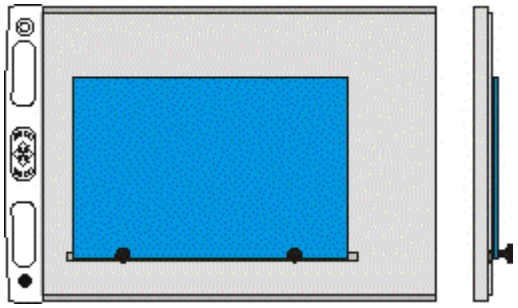
Ensure all other personnel stays in a safe distance from all moving parts.

Use hearing protectors.

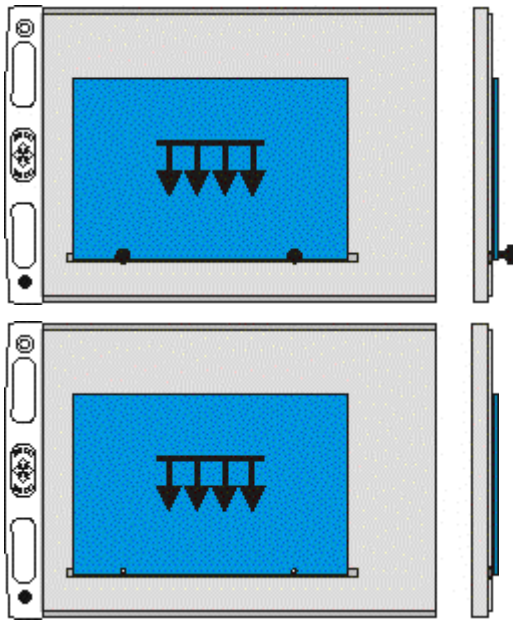


Place the sheet of material onto the cutting table and align the holes in the material with the positioning pin holes.

Insert the positioning pins.



When both positioning pins are in place, the sheet is correctly positioned.

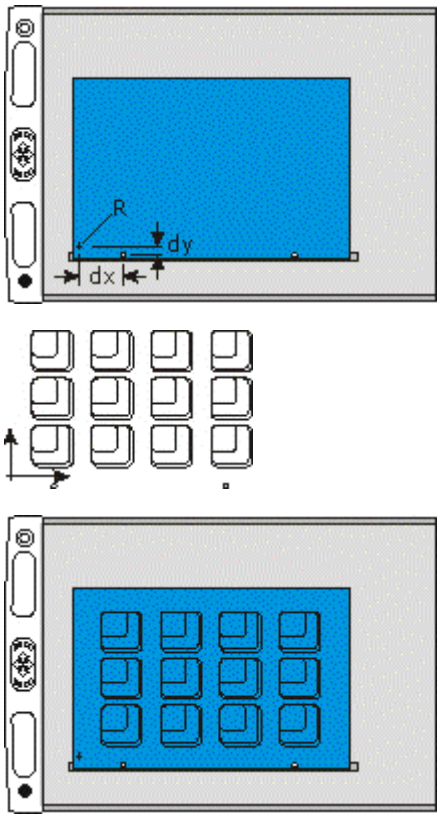


Switch vacuum on.

IMPORTANT: Remove the Positioning pins.

Now, the machine is ready for operation.

5.12.2 Reference point setting



When working with register bar, select one of the available Reference points (Option->Table options) and set a reference point in a fixed position relative to one of the Positioning pins
(R in the illustration).

This position should be used as origin during geometry design and cam file generation.

When preparing the job in the CAD - system, use the same Reference point as origin.

This work flow ensures exact positioning of the geometry relative to the Positioning pins.

6.Work with ARS

6.1 Introduction

XPA offers different levels of automation for Registration mark reading:

1 -	Manual reading of 2 - 4 registration marks by use of laser pointer (standard).
2 -	Manual reading of 2 - 4 registration marks viewed by camera (option).
3 -	Automatic reading 2 - 4 registration marks. Linear transformation (option).

This document will cover all ARS – related issues.

The camera solution used in ARS is based upon a Scorpion software package.

Thus, it is a pre-requisite that Scorpion is properly installed and configured together with XP-Guide in order to make ARS work.

6.2 ARS - modes of operation

6.2.1 Introduction

The different modes of operation are selected from the **Registration setup** dialog (**XP-Guide->Options->Registration setup).**

The same dialog is available from the **Registration setup** button on the Job view toolbar.

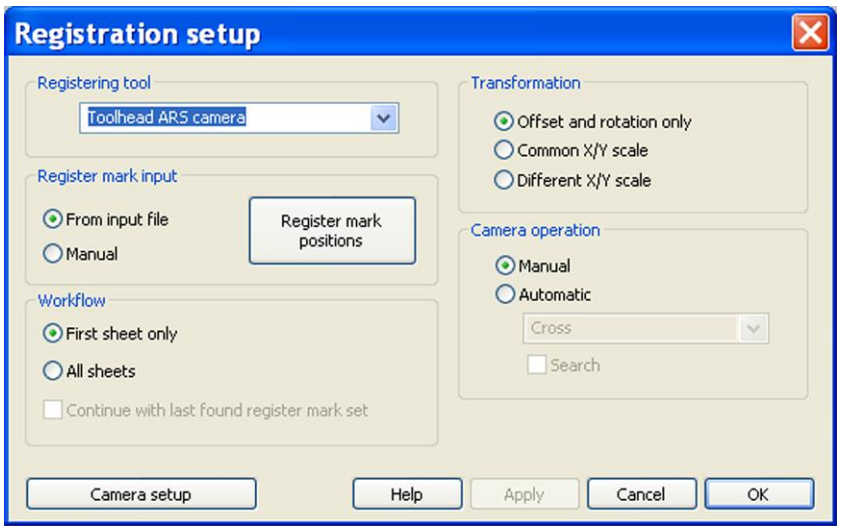
The **Registration setup** button itself changes face in order to show the Registering tool currently selected:

	No registration is enabled.
	Manual registration using the laser pointer as pointing device is currently selected.
	Camera above table surface is selected.
	Camera below table surface is selected.

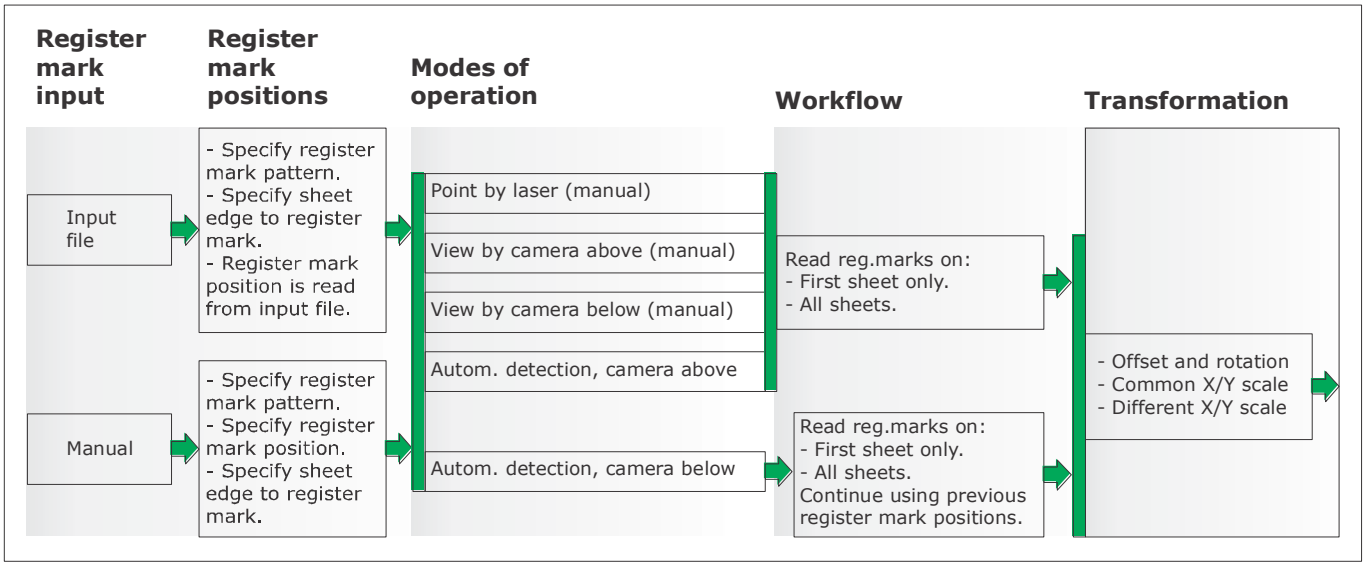
Pressing this button, regardless its face opens the **Registration setup** dialog.

6.2.2 Registration setup

All settings described in this chapter are available from **XP-Guide->Options->Registration setup**:



The combination of the different parameters in this dialog specifies a certain mode of operation as illustrated in this figure:


Register mark input
Register mark positions
Modes of operation
Workflow
Transformation
Input file
- Specify register mark pattern.
- Specify sheet edge to register mark.
- Register mark position is read from input file.
Manual
- Specify register mark pattern.
- Specify register mark position.
- Specify sheet edge to register mark.
Point by laser (manual)
View by camera above (manual)
View by camera below (manual)
Autom. detection, camera above
Autom. detection, camera below
Read reg.marks on:
- First sheet only.
- All sheets.
Read reg.marks on:
- First sheet only.
- All sheets.
Continue using previous register mark positions.
- Offset and rotation
- Common X/Y scale
- Different X/Y scale

The mode of operation is specified by 4 (5) parameters as illustrated above:

- **Register mark input**
- **Register mark positions**
- Modes of operation (combination of **Registering tool** selection and **Camera operation**)
- **Workflow**
- **Transformation**

6.2.2.1 Registering tool

From the drop-down list, select the method (tool) to use when reading registration marks:

No registration	All ARS functionality is disabled.
Laser pointer	Manual registration using the laser pointer as pointing device (64).
Toolhead ARS camera	Camera above table surface is selected.
In-stack ARS camera	Camera below table surface is selected.

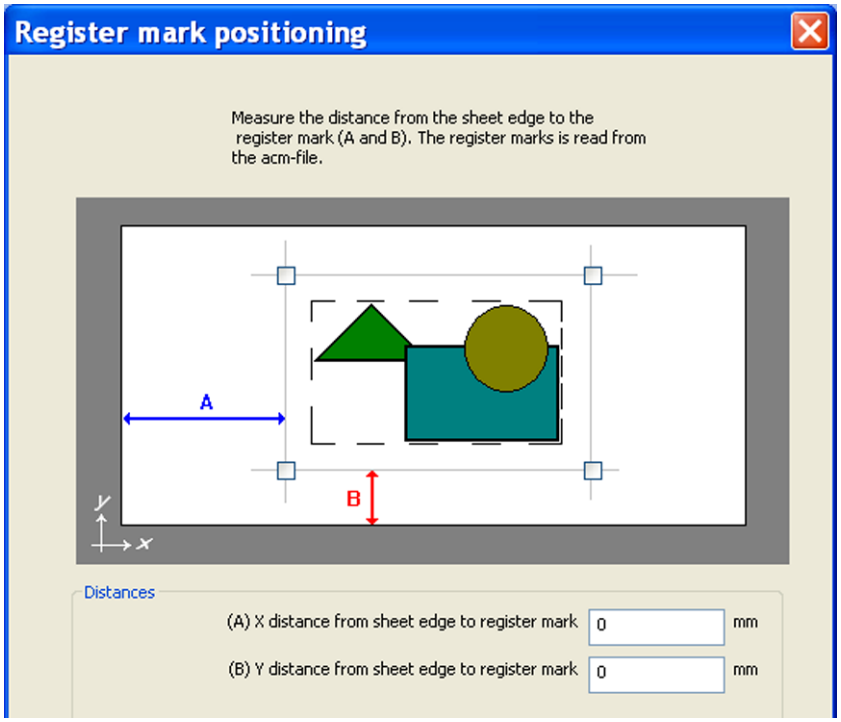
6.2.2.2 Register mark input

Specify how the location of the register marks is specified to the system:

From input file
The location of the register marks, relative to the design, is specified in the input file, provided by the CAD–system (**Error! Bookmark not defined.**).

You have to specify the position of the first register mark relative to sheet edge:

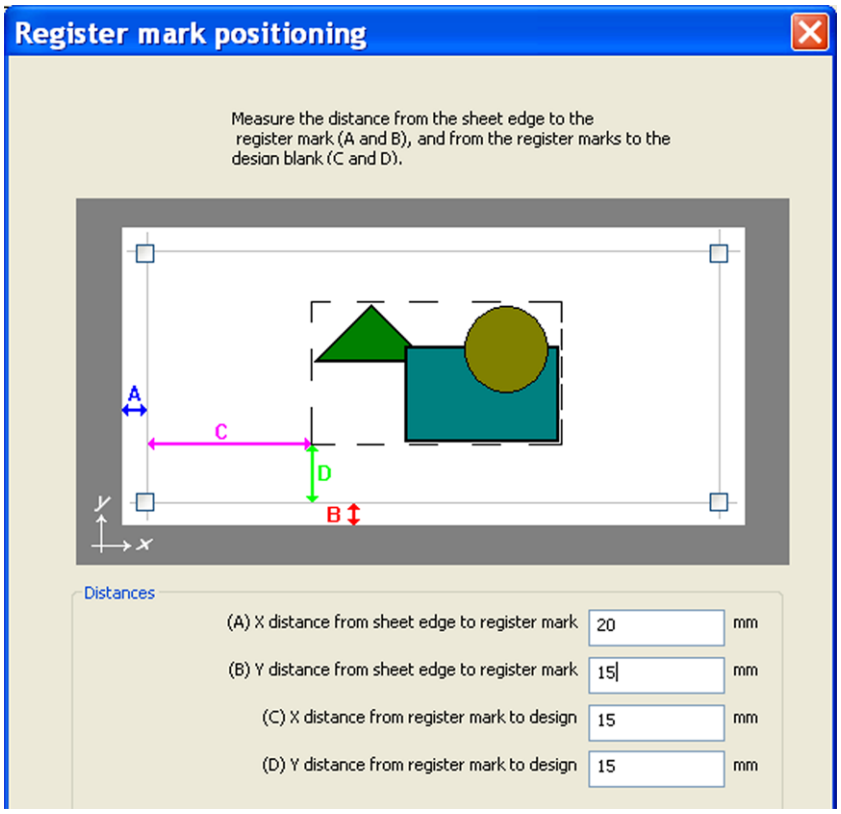
Press the **Register mark positions** button to access this dialog:


Register mark positioning
Measure the distance from the sheet edge to the register mark (A and B). The register marks is read from the acm-file.
A
B
Distances
(A) X distance from sheet edge to register mark
0
mm
(B) Y distance from sheet edge to register mark
0
mm

- Measure the distances on the material and enter the values as described in the dialog.

Manual
The location of the register marks is entered manually.

Press the **Register mark positions** button to access this dialog:

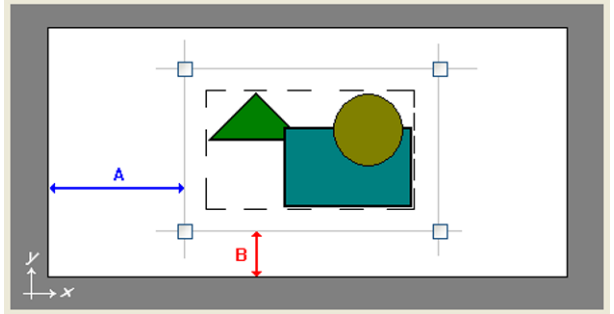

Register mark positioning
Measure the distance from the sheet edge to the register mark (A and B), and from the register marks to the design blank (C and D).
A
C
D
B
Distances
(A) X distance from sheet edge to register mark
20
mm
(B) Y distance from sheet edge to register mark
15
mm
(C) X distance from register mark to design
15
mm
(D) Y distance from register mark to design
15
mm

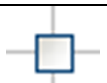
- Measure the distances on the material and enter the values as described in the dialog.

6.2.2.3 Register mark positions

As described in the previous chapters, this dialog is used to enter register mark positions.

In addition, use this dialog to specify the registration mark pattern:



	No registration mark in this position.
	A registration mark is located in this position.

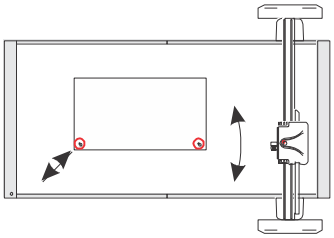
6.3 Workflow

Specify register mark read workflow:

First sheet only	Register mark registration is completed on the first sheet in a job; the rest of the job is executed using the same registration information.
All sheets	Reading register marks will be carried out for every sheet of material in a job.
Use previous register mark positions and continue	This option is available for the ARS below camera only: If, for any reason, it is impossible to detect a registration mark properly, the job execution will continue using the registration mark position obtained for previous sheet. The incident will be saved and displayed in the **Job report**.

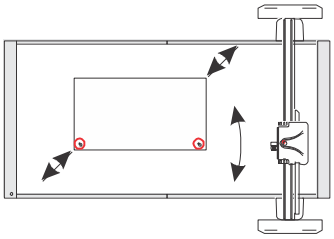
6.4 Transformation

6.4.1 Offset and rotation only



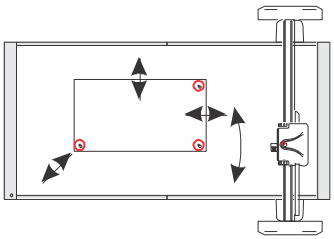
The design is offset and rotated. No scaling is applied. To calculate rotation minimum two marks are required.

6.4.2 Common X/Y scale (Uniform)



In addition to offset and rotation, the system will calculate a scale factor.
Both axes are scaled with the same factor.

6.4.3 Different X/Y scale (non-uniform)



With this option, offset, rotation and scale is calculated, allowing different scale factors for the main design axes. Minimum three register marks are required.

6.5 Camera operation

Camera operation settings are available if the selected **Registering tool** is ARS camera, either above or below material.
If your registering tool is Laser pointer, the Camera operation settings are disabled. In this case, the system will operate in manual mode only:

6.5.1 Manual

The manual camera operation workflow is as follows:
1. The camera will be positioned on to the first registration mark.
2. A picture showing the registration mark is displayed.
3. If there is a deviation between the camera cross and the register mark, point in the center of the register mark with the mouse pointer and press the left mouse button.
4. The execution will continue to the next register mark and the procedure is repeated from (2).

6.5.2 Manual using the Laser pointer

As the manual operation using the Laser pointer is very similar to using the camera, the workflow description is included here:

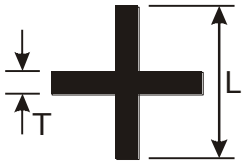
1. The laser pointer will be positioned on to the first register mark.
2. If there is a deviation between the laser pointer spot and the register mark, move the laser pointer into the center of the register mark. Press *Start*.
3. The execution will continue to the next register mark and the procedure is repeated from (1).

6.5.3 Automatic detection of register marks

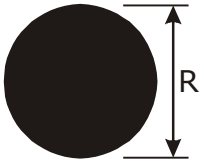
The system will, by means of a camera picture, automatically detect the position of the register mark.

Circle or cross as register mark

Specify if the register mark is a cross or a circle.
The geometry requirements are:



2 mm < L < 12 mm
1 mm < T < 0.5 * L



2 mm < R < 12 mm

Search

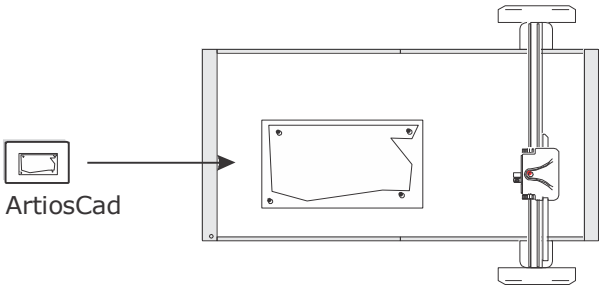
If no register mark is detected inside the camera picture, the system will try to search for a register mark around the expected location (twice the size of the camera picture).

6.6 Camera setup

Enter the **Camera setup** dialog (**Error! Bookmark not defined.**).

6.7 Work with ARS (Automatic Registration System)

6.7.1 Pre-defined register marks



When the position of the register marks is included in the Input file to XP-Guide, we call it pre-defined register marks.

From ArtiosCAD, a maximum of 4 pre-defined register marks can be added to the design.
A description on how to generate register marks in ArtiosCAD is available from the document ServiceGuide_XP_ARS on the XP-Guide CD.

6.7.2 Reading pre-defined register marks automatically

Take care:
Knife blades are extremely sharp.
Keep away from all moving parts.
Ensure all other personnel stays in a safe distance from all moving parts.
Use ear protection.

Select this alternative if:

- An ARS – camera is available.
- Standard register marks are available on the material, visible to the camera.
- Coordinates for the registration marks are defined in the input file. ArtiosCAD and Digital Flexo Suite are able to do so.

6.7.2.1 Procedure

- Prepare for the job as described in the User manual for XPA.
- Select operation mode (**Error! Bookmark not defined.**).
- Specify the register mark to sheet edge distance (61).
- During execution, the register marks are examined one by one and compensations are calculated before the job is completed.
- If, for any reason, the register mark is not detected, the execution will stop and a picture is displayed in the GUI. The following alternatives are available:
  1. If the register mark is visible inside the picture frame, position the mouse pointer in the center of the register mark and left-click the mouse.
  2. If you are working with ARS camera above, you can jog the camera position until the cross is exactly on top of the register mark. Press *Start* to continue to next mark.
  3. Press Enter on the keyboard to take another picture.
  4. Terminate the job; press *Stop* + *Init*.

6.7.3 Reading register marks manually

Take care:

Knife blades are extremely sharp.

Keep away from all moving parts.

Ensure all other personnel stays in a safe distance from all moving parts.

Use ear protection.

Select this alternative if:

- Register marks are available, but the marks can not be recognized by the camera due to shape or lack of contrast.
- Automatic register mark detection is not available.

6.7.3.1 No pre-defined register marks available

Manual read of register marks is available in both cases; if the register mark position relative to the design is included in the input file or not.
The difference is:

- Pre-defined register marks can be placed in different positions independent from each other (71).

- For manually defined register marks, the following rules apply:
  - There are restrictions for the layout of the register marks (72).
  - The register mark position relative to the design has to be specified to the system (61).

These rules apply in both cases; if a camera or a laser pointer is used.

6.7.3.2 Procedure using ARS camera above

1. Prepare for the job as described in the User manual for XPA.
2. Select operation mode (**Error! Bookmark not defined.**).
3. Specify the register mark to sheet edge distance (61).
4. If no pre-defined register marks are available, specify the distances manually (61).
5. After *Start*, the execution will stop for each register mark and the camera picture is displayed in the GUI.
6. Two alternatives are available:

   Use the register mark by mouse click
   - If necessary, move the camera to a position where the register mark is inside the picture using manual jog.
   - In the picture, move the cursor over the center of the register mark and press the left mouse button.
   - If the mouse-click was inside the green circle, the machine will move to the next register mark and the procedure is repeated.
     If the mouse-click was outside the green circle, the machine will move until the "click-position" is close to the center of the green circle. Now, move the cursor over the center of the register mark and press the left mouse button once more.

   Use the register mark by jog
   - By manual jog, move the camera until the centre cross is exactly on top of the register mark.

- Press *Start* to continue execution.

7. After the last register mark is found, the compensation parameters are calculated and the job is completed.

6.7.3.3 Procedure using ARS camera below

1. Prepare for the job as described in the User manual for XPA.
2. Select operation mode (**Error! Bookmark not defined.**).
3. Specify the register mark to sheet edge distance (61).
4. If no pre-defined register marks, specify the distances (61).
5. After *Start*, the execution will stop for each register mark and the camera picture is displayed in the GUI.
6. Three alternatives are available:

   - If the register mark is visible inside the picture frame, position the mouse pointer in the center of the register mark and left-click the mouse.
   - Press Enter on the keyboard to take another picture.
   - Terminate the job; press *Stop* + *Init*.

7. After the last register mark is found, the compensation parameters are calculated and the job is completed.

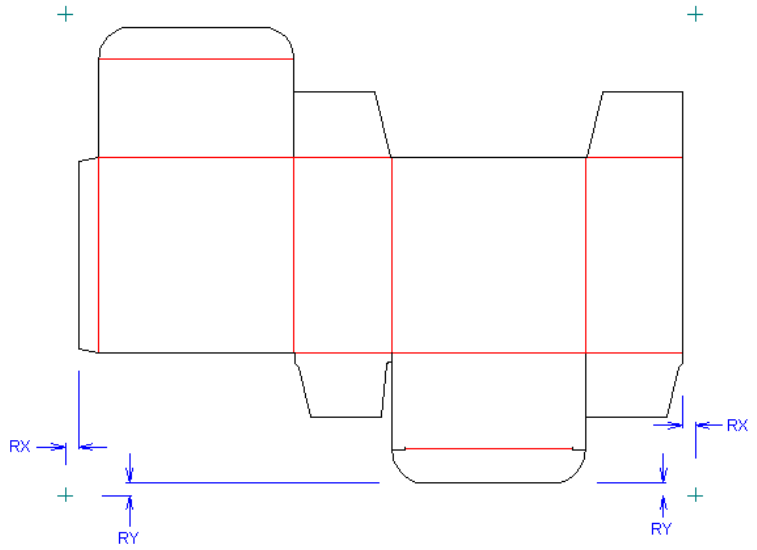
6.7.3.4 Procedure using laser pointer

1. Prepare for the job as described in the User manual for XPA.
2. After *Start*, the execution will stop for each register mark.
3. By manual jog, move the laser pointer into the center of the register mark.
4. Press *Start* to move to the next register mark and repeat the procedure.
5. After the last register mark is found, the compensation parameters are calculated and the job is completed.

6.8 Register mark positions

6.8.1 Register mark to design blank - key parameters

This chapter describes the work flow from Structural design through Graphical design and print and finally to Corrugated production and how the register marks are treated in the different steps:

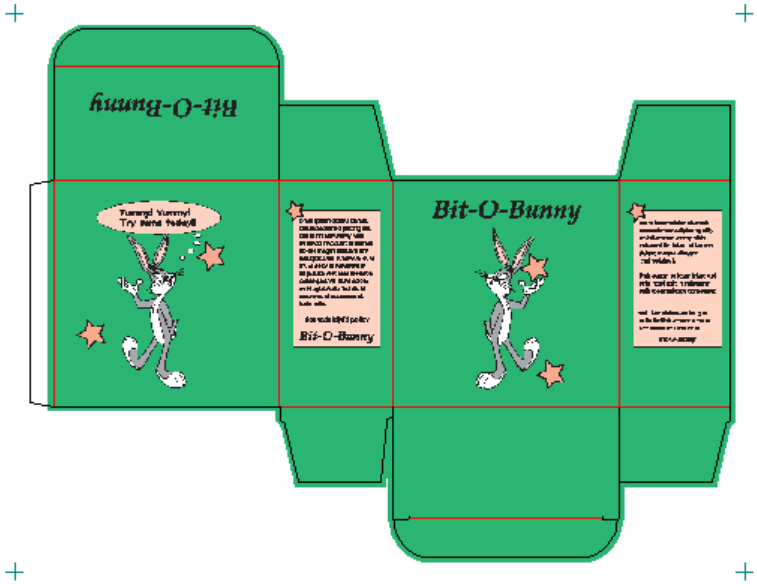


Structural design

The structural design is prepared using a design software tool, as ArtiosCAD.

The register marks are positioned symmetric and in a known position relative to the design (Rx and Ry).

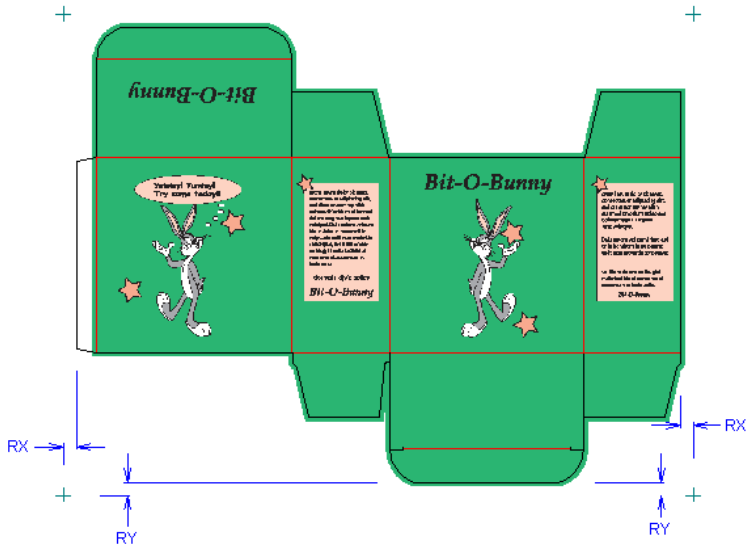
In a company working with this system, one should standardize these values and use the same offset (Rx and Ry) in all designs.



Graphical design and print

The graphical design is prepared using a graphical design software tool.

The structural design template (output from the CAD system) is used to correctly position the graphics and the register marks relative to the structural design.



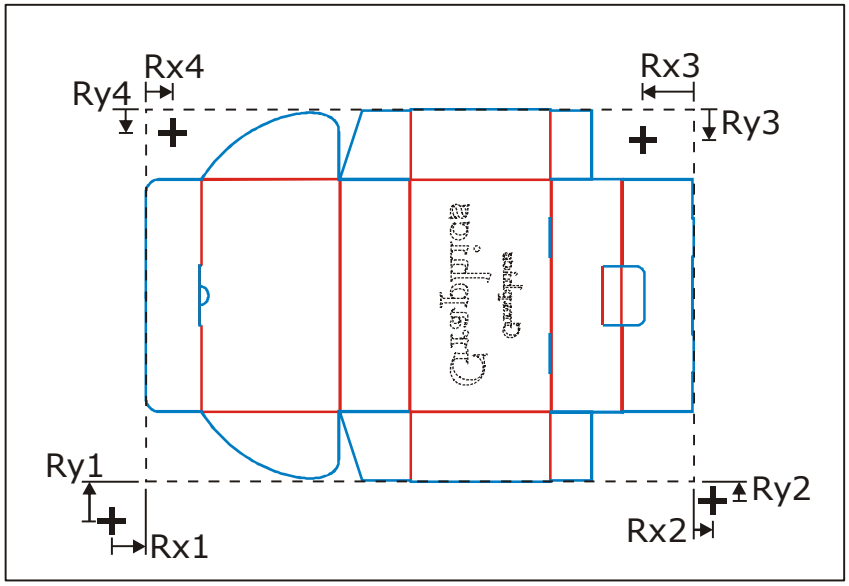
Corrugated production

On the Cutting table, the offset values Rx and Ry must be entered manually into the system.

When the position of the register marks is obtained, offset Rx, Ry is used to position the structural design relative to the register marks.

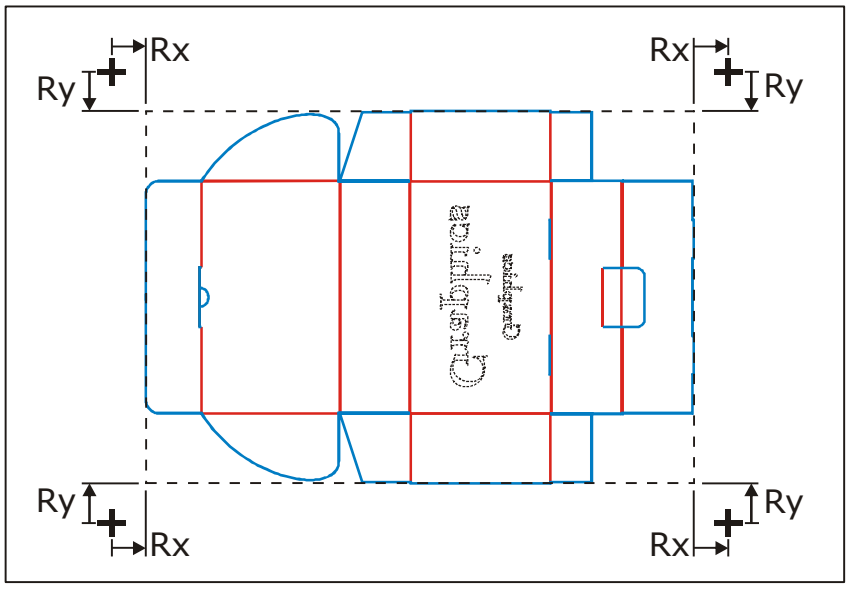
Rx, Ry - distance from **Register mark to design blank**

6.8.2 Pre-defined register marks



The position of the pre-defined register marks is included in the input file. There are no restrictions regarding where the different register marks are located.

6.8.3 Register marks for manual read



The register marks are supposed to be symmetrically distributed around the design.
The Rx, Ry value has to be specified to the system (61).

This register mark layout is recommended for both automatic and manual read of register marks.
It is the standard output from ArtiosCAD.

6.9 Camera calibration, camera above

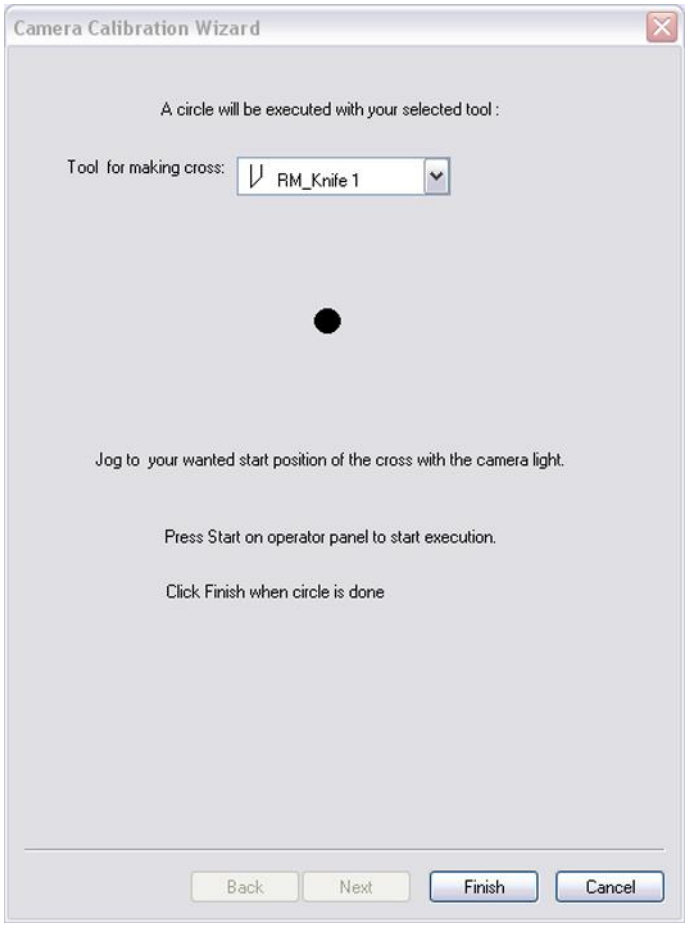
Take care:

Knife blades are extremely sharp.
Keep away from all moving parts.
Ensure all other personnel stays in a safe distance from all moving parts.
Use ear protection.

To achieve better accuracy when using the ARS, the camera should be calibrated.

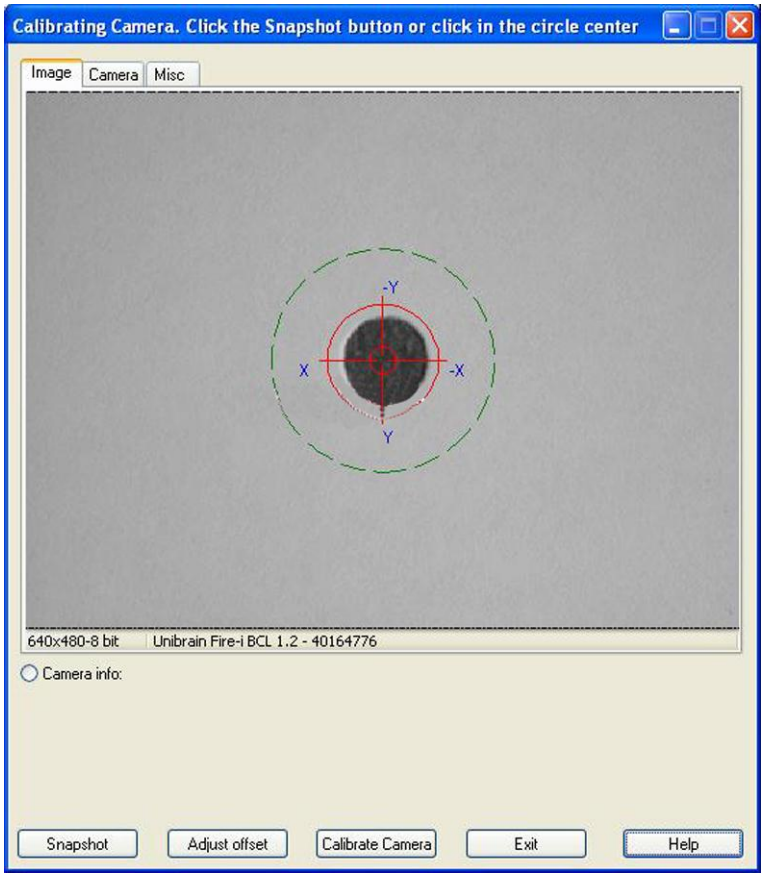
6.9.1 Procedure

Select the camera calibration wizard:
Option->Registration setup (Alt+R)->Camera setup->Calibrate camera.


Camera Calibration Wizard
A circle will be executed with your selected tool :
Tool for making cross:
RM_Knife 1
Jog to your wanted start position of the cross with the camera light.
Press Start on operator panel to start execution.
Click Finish when circle is done
Back
Next
Finish
Cancel

1. Place a sheet of material on the table.
2. Select the tool to be used when making a circle. Use a knife tool.
3. Press *Start* to make the circle.
4. Press **Finish**.
5. Press **Close** to continue.
6. Remove the material from inside the circle.

The camera dialog will be shown with the circle inside the picture:



1. If camera focus has to be adjusted, do it now by turning the camera lens in or out.
2. Click the **Snapshot** – button and the machine will move to the next point.
3. Continue to click **Snapshot** until all points are completed and the dialog disappears.

The camera is now calibrated.

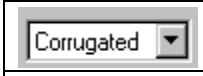
6.10 Adjust camera offset

Take care:

Knife blades are extremely sharp.
Keep away from all moving parts.
Ensure all other personnel stays in a safe distance from all moving parts.
Use ear protection.

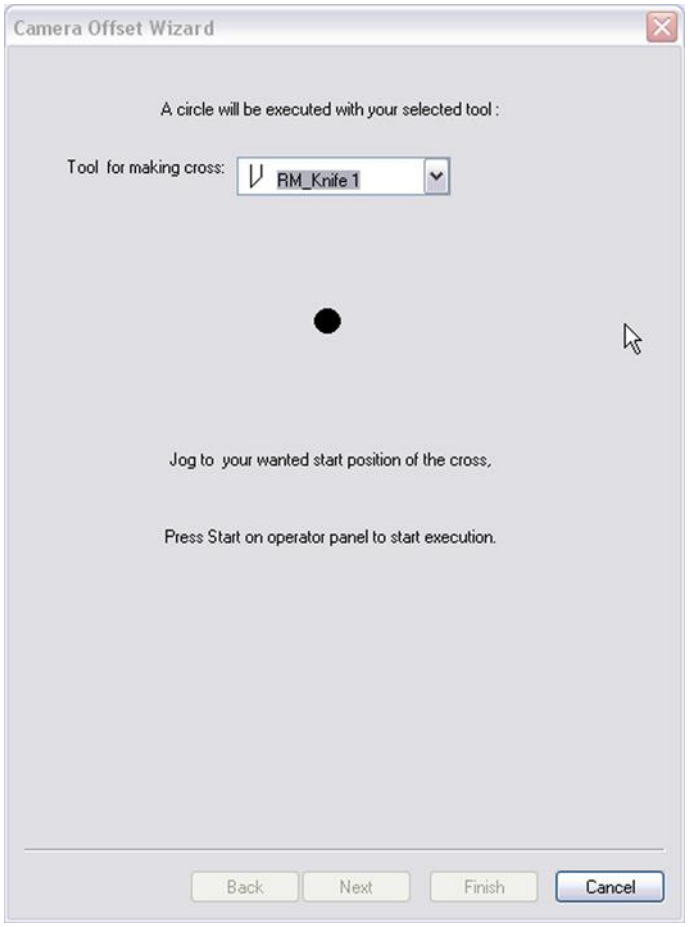
Follow this procedure to calibrate the camera position relative to the other tools in the tool holder:

6.10.1 General

	• As the camera is mounted outside the tool head cover, it is important that this test is carried out with the cover mounted.
	• All test files to be used are available from the folder: c:\xp-guide\iat
	• From **Options->Table options**, select **Manual Vacuum control** to ensure vacuum stays on during the complete procedure.
	• From **Main Toolbar->Application selection**, select Corrugated.
	• From **Job View Toolbar-> Select Reference point**, select **Panel Ref. point**.
	• For this procedure, use a thin sheet of carton (500 x 600 mm) as test material.
	• To continue in next chapter

6.10.2 Procedure

Select **Options->Registration setup->Camera setup->Adjust camera offset**:


Camera Offset Wizard
A circle will be executed with your selected tool :
Tool for making cross:
RM_Knife 1
Jog to your wanted start position of the cross,
Press Start on operator panel to start execution.
Back
Next
Finish
Cancel

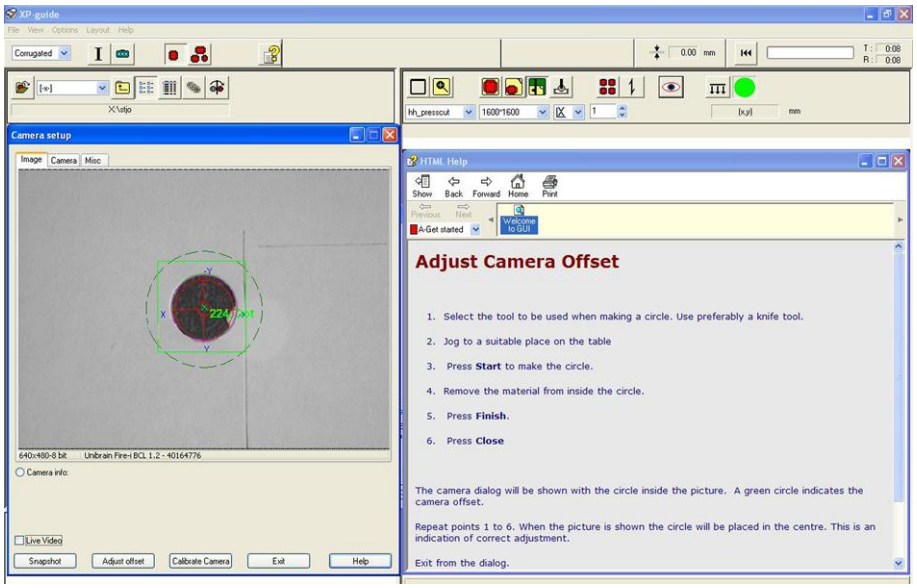
The wizard will create a circle, which will be used for offset adjustment.

From the drop-down menu in the dialog, select the tool to be used, preferably a knife.

With a sheet of material on the table, switch *Vacuum on*.

Jog to a proper position on the sheet and press *Start*. Note: In this case, the position is the position of the camera.

The cross is made and the camera is positioned above the cross. The following dialog appears:


Camera setup
HTML Help
Adjust Camera Offset
1. Select the tool to be used when making a circle. Use preferably a knife tool.
2. Jog to a suitable place on the table
3. Press Start to make the circle.
4. Remove the material from inside the circle.
5. Press Finish.
6. Press Close
The camera dialog will be shown with the circle inside the picture. A green circle indicates the camera offset.
Repeat points 1 to 6. When the picture is shown the circle will be placed in the centre. This is an indication of correct adjustment.
Exit from the dialog.
Snapshot
Adjust offset
Calibrate Camera
Exit
Help

In the dialog, press **Finish**.

In the **Continue Adjustment** dialog, press **Close**.

Switch *Vacuum off*.

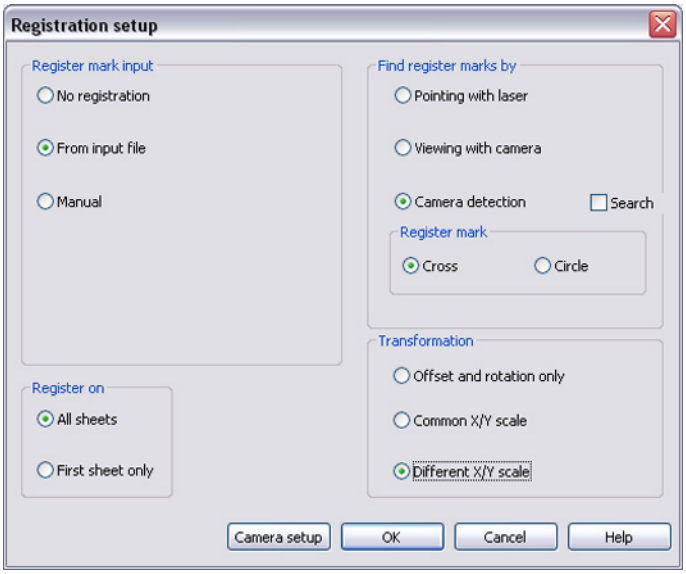
Now, the camera offset is properly adjusted.

6.11 Camera above, verify correct offset adjustment

6.11.1.1 Draw the test figure

1	Select **No registration**: **Option->Registration setup (Alt+R)->No registration.**
2	Open the file regtestd.acm
3	Place a sheet of carton, 400 x 400 mm, on the table.
4	Switch *Vacuum on* to keep the sheet in a stable position.
5	Configure **Job setup** to have a pen tool for line 1, 2 and 5.
6	Jog to a start position (laser pointer) in the –X, -Y corner of the sheet.
7	Press *Init.*
8	Press *Start* to draw the file.

6.11.1.2 Draw the test figure using registration marks

1	Select **Register mark input from input file** and **Camera detection**: **Option->Registration setup (Alt+R)->From input file.** **Option->Registration setup (Alt+R)->Camera detection.**
	
2	Open the file regtest.acm using the same **Job setup** (pen tool for line 1, 2 and 5).
3	Jog to a start position (laser pointer) in the –X, -Y corner of the sheet and press *Init*.
4	Press *Start*.
5	The program will automatically read 4 registration marks and execute the file.
6	Inspect the final result. Requirement: The angles prepared by this file should be positioned exactly on the two registration marks prepared by the first file.

6.12 Camera calibration, camera below

	Take care: • Knife blades are extremely sharp. • Keep away from all moving parts. • Ensure all other personnel stays in a safe distance from all moving parts. • Use ear protection.

6.12.1 Introduction

Prerequisites for this procedure:

Tool adjustments	All tool adjustments are completed.
Adjust sheet corner	The Adjust sheet corner wizard has been completed. **Started from: Options->Table option->Adjust Sheet corner**
	Manual load mode is disabled.
Suction cups	All 4 suction cups on the XP traverse should be enabled and positioned in such a way that all 4 are picking up the template sheet.
Suction cups	Turn off any suction cup shaking and delay.
Calibration template	This template is required in order to complete this procedure.

Notes:
1. Two persons are required in order to complete these wizards properly; one for manual jog/GUI operations and one near the Cutting table.
2. To terminate any of the wizards, press *Stop* and *Init*.

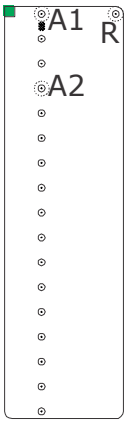
The calibration wizards should be executed in the sequence they are described here:

1. Calibrate In-stack alignment relative to Cutting table
2. Camera offset adjustment (coarse)
3. Camera offset adjustment (fine)
4. Lens distortion calibration
5. Axis straightness adjustment
6. Camera offset adjustment (manual)

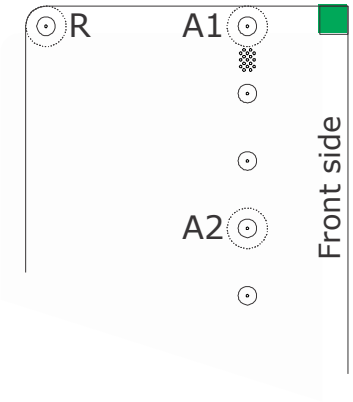
6.12.2 Camera calibration template

Included in the XPA shipment is a calibration template:

Template is used with front side up and..



Front side down

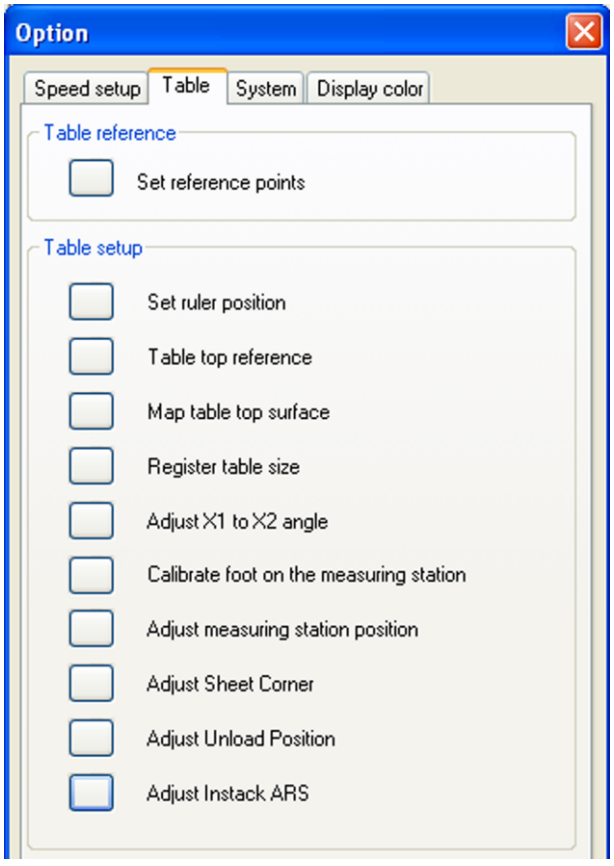


The holes A1, A2 and R are used for manual positioning.

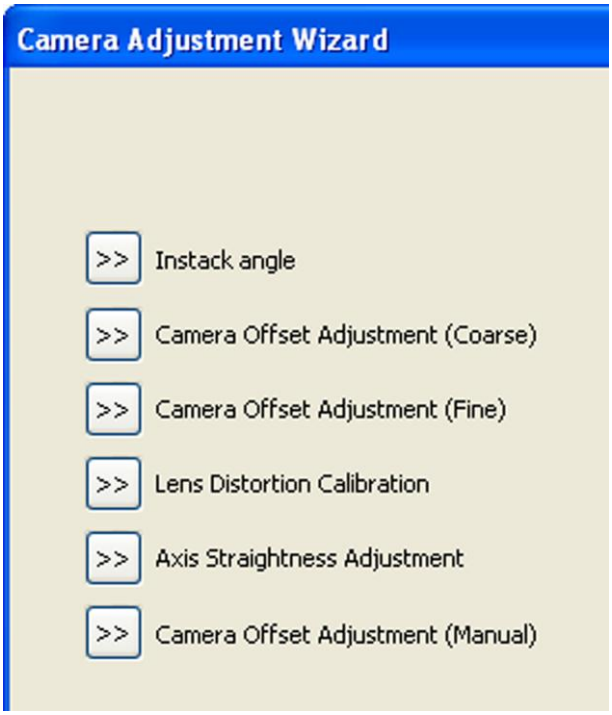
The green dot is indicating the straight corner.

6.12.3 Wizard selection

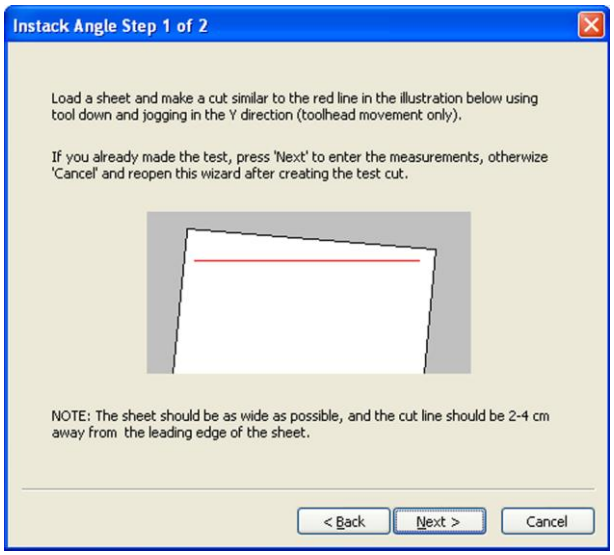
Calibration of ARS below camera is initiated from **Options->Table option->Adjust Instack ARS.**

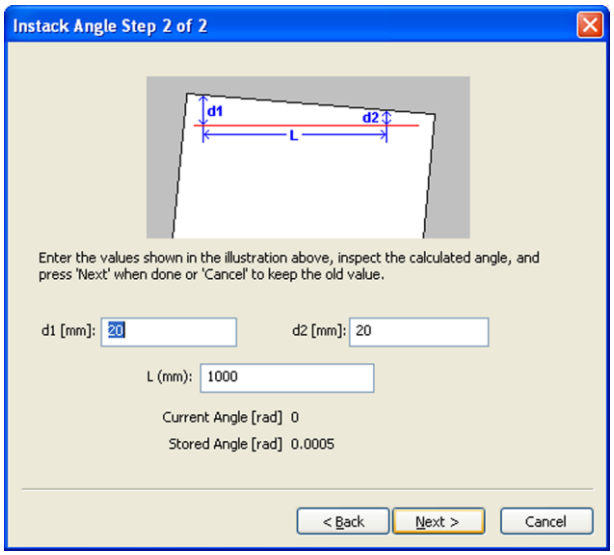


The wizard selection dialog is displayed:


Camera Adjustment Wizard
>> Instack angle
>> Camera Offset Adjustment (Coarse)
>> Camera Offset Adjustment (Fine)
>> Lens Distortion Calibration
>> Axis Straightness Adjustment
>> Camera Offset Adjustment (Manual)

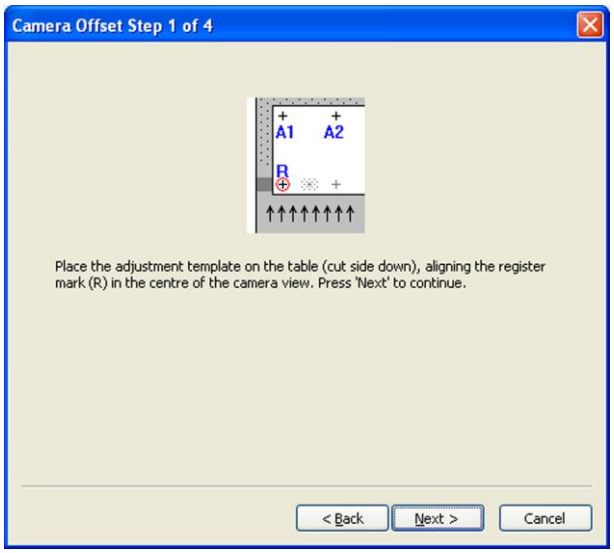
6.12.4 In-stack angle


Instack Angle Step 1 of 2
Load a sheet and make a cut similar to the red line in the illustration below using tool down and jogging in the Y direction (toolhead movement only).
If you already made the test, press 'Next' to enter the measurements, otherwize 'Cancel' and reopen this wizard after creating the test cut.
NOTE: The sheet should be as wide as possible, and the cut line should be 2-4 cm away from the leading edge of the sheet.
< Back
Next >
Cancel


Instack Angle Step 2 of 2
d1
d2
L
Enter the values shown in the illustration above, inspect the calculated angle, and press 'Next' when done or 'Cancel' to keep the old value.
d1 [mm]: 20
d2 [mm]: 20
L (mm): 1000
Current Angle [rad] 0
Stored Angle [rad] 0.0005
< Back
Next >
Cancel

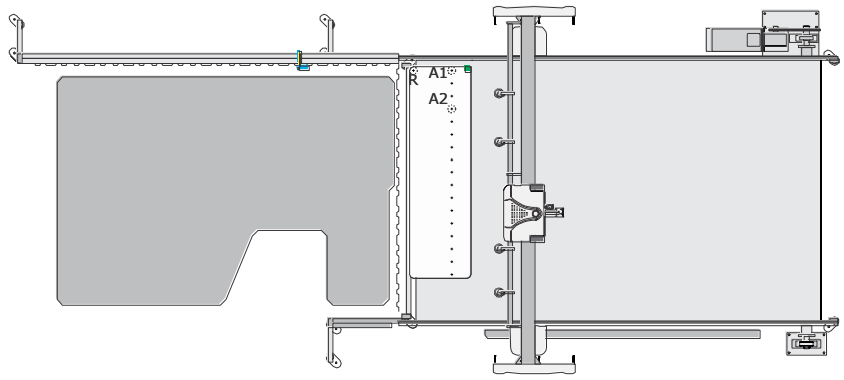
6.12.5 Camera offset adjustment (coarse)

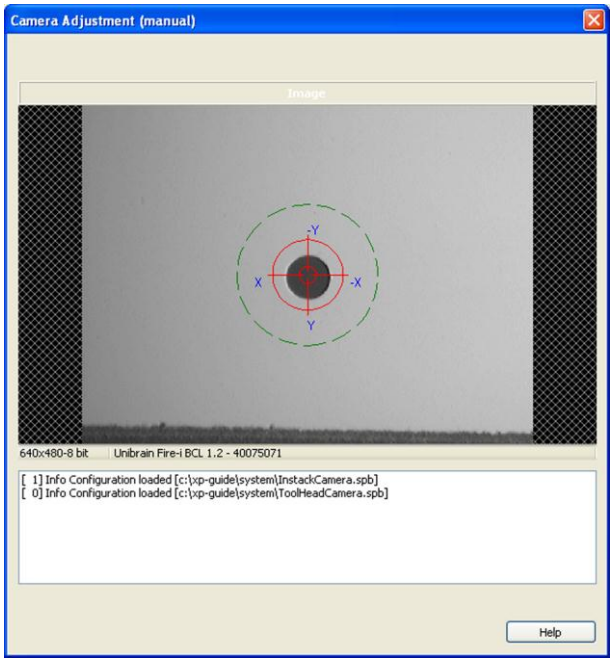
Start the wizard from
Options->Table option->Adjust Instack ARS-> Camera offset adjustment (coarse).


Camera Offset Step 1 of 4
A1
A2
R
Place the adjustment template on the table (cut side down), aligning the register mark (R) in the centre of the camera view. Press 'Next' to continue.
< Back
Next >
Cancel

Place the calibration template on the cutting table, front side up, as shown in the picture below.

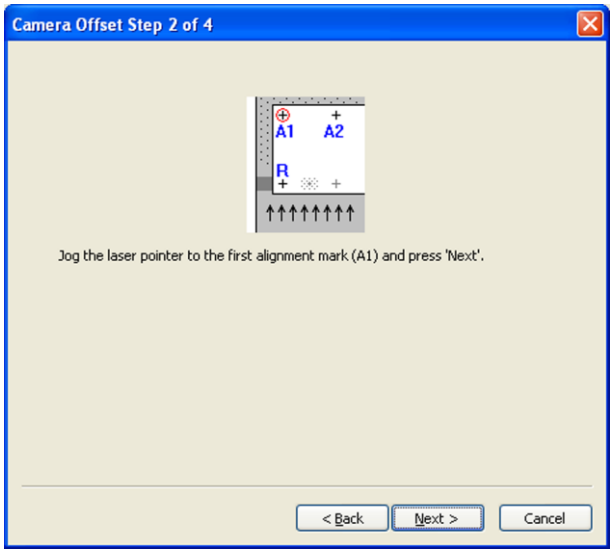
Move the template by hand until you see hole R in the center of the camera picture.



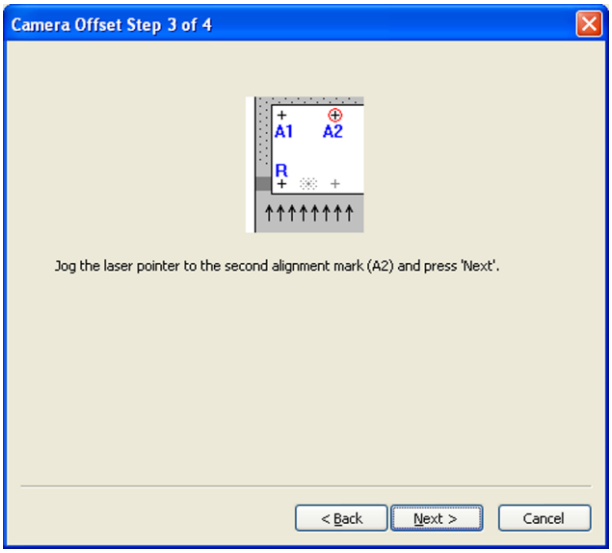


At the same time as you move the template in order to position hole R in the center of the picture, the edge of the template should be parallel to the Y-axis on the table (vacuum holes).

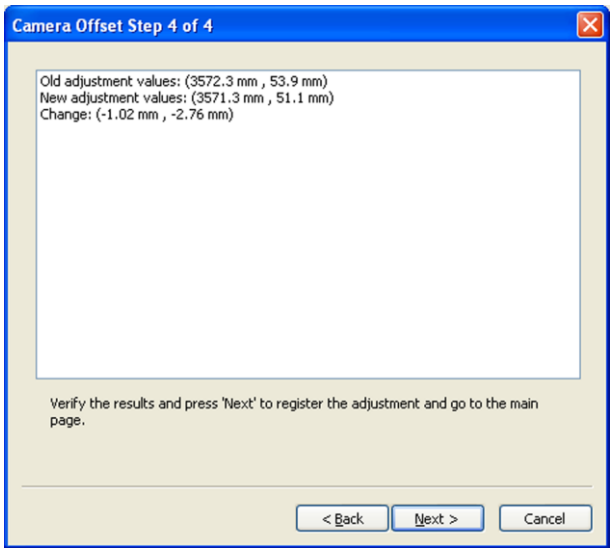
When ready, press Next.


Camera Offset Step 2 of 4
A1
A2
R
Jog the laser pointer to the first alignment mark (A1) and press 'Next'.
< Back
Next >
Cancel

>

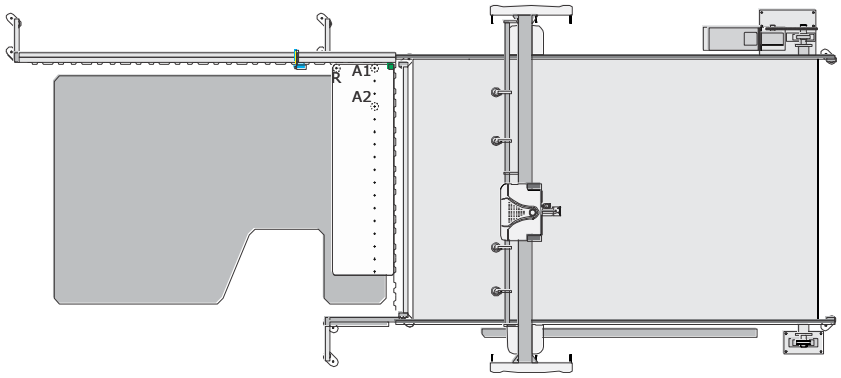

Camera Offset Step 3 of 4
A1
A2
R
Jog the laser pointer to the second alignment mark (A2) and press 'Next'.
< Back
Next >
Cancel

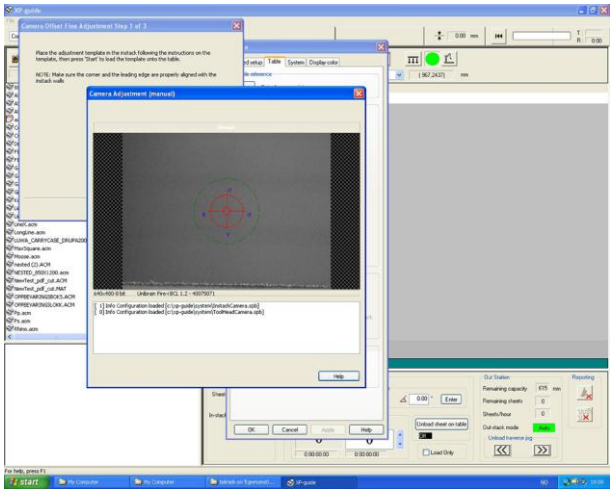
>


Camera Offset Step 4 of 4
Old adjustment values: (3572.3 mm , 53.9 mm)
New adjustment values: (3571.3 mm , 51.1 mm)
Change: (-1.02 mm , -2.76 mm)
Verify the results and press 'Next' to register the adjustment and go to the main page.
< Back
Next >
Cancel

6.12.6 ARS camera below, camera offset adjustment (fine)

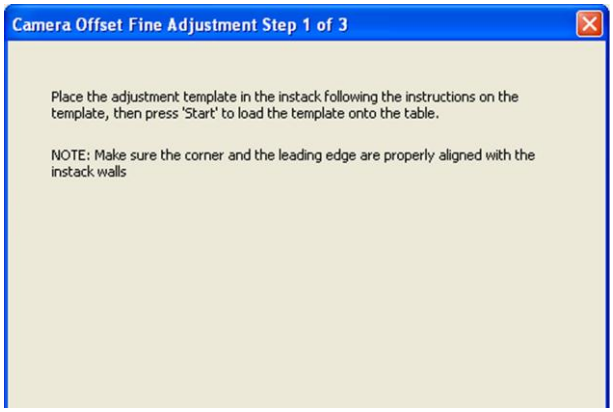
Start the wizard from
Options->Table option->Adjust Instack ARS-> Camera offset adjustment (fine).





Sometimes, the wizard dialog is hidden behind the camera dialog.

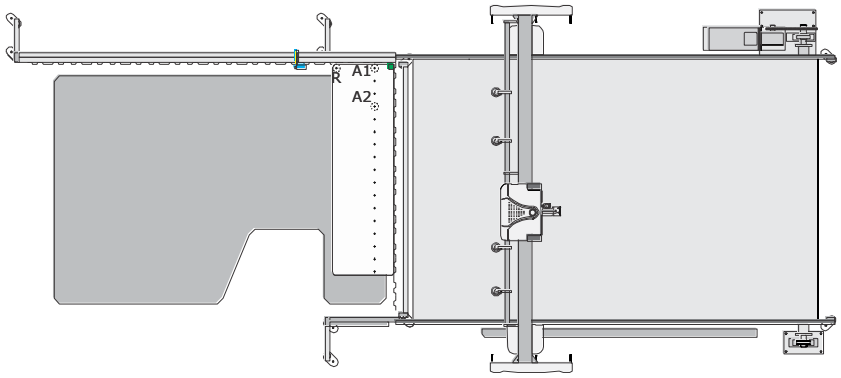
Fetch the camera dialog and move it aside of the wizard dialog.

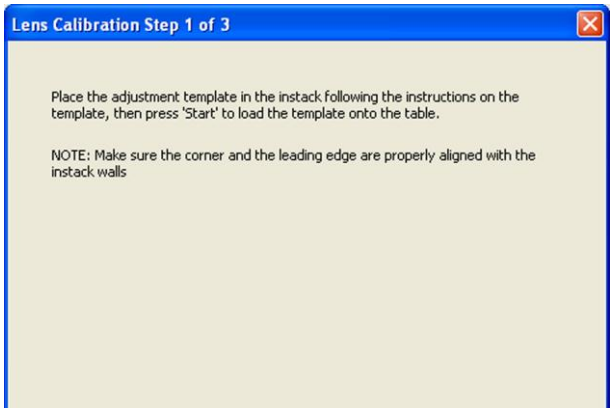

Camera Offset Fine Adjustment Step 1 of 3
Place the adjustment template in the instack following the instructions on the template, then press 'Start' to load the template onto the table.
NOTE: Make sure the corner and the leading edge are properly aligned with the instack walls

Follow the instructions in the wizard.

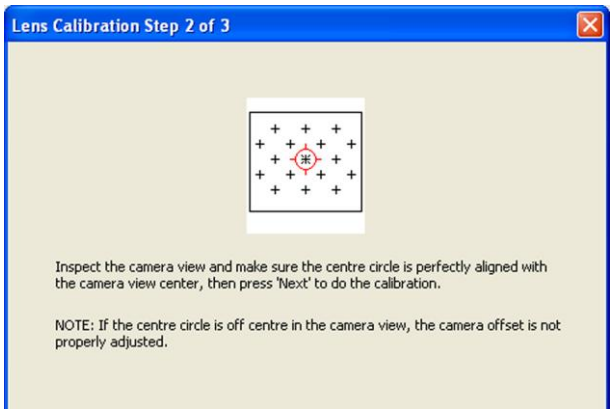
6.12.7 ARS camera below, lens distortion calibration

Start the wizard from
Options->Table option->Adjust Instack ARS->Lens distortion calibration.



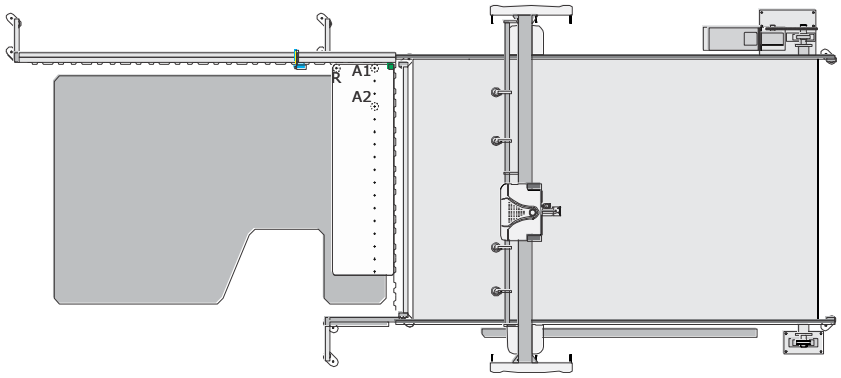

Lens Calibration Step 1 of 3
Place the adjustment template in the instack following the instructions on the template, then press 'Start' to load the template onto the table.
NOTE: Make sure the corner and the leading edge are properly aligned with the instack walls

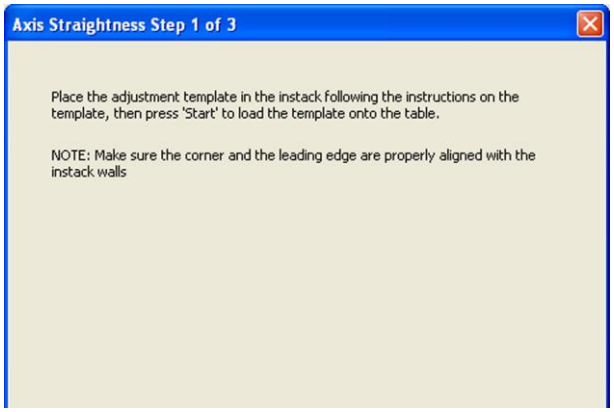
Follow the instructions in the wizard.


Lens Calibration Step 2 of 3
Inspect the camera view and make sure the centre circle is perfectly aligned with the camera view center, then press 'Next' to do the calibration.
NOTE: If the centre circle is off centre in the camera view, the camera offset is not properly adjusted.

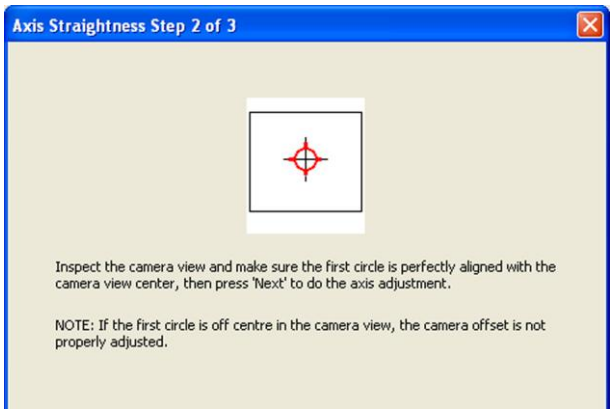
6.12.8 ARS camera below, axis straightness adjustment

Start the wizard from
Options->Table option->Adjust Instack ARS->Axis straightness adjustment.



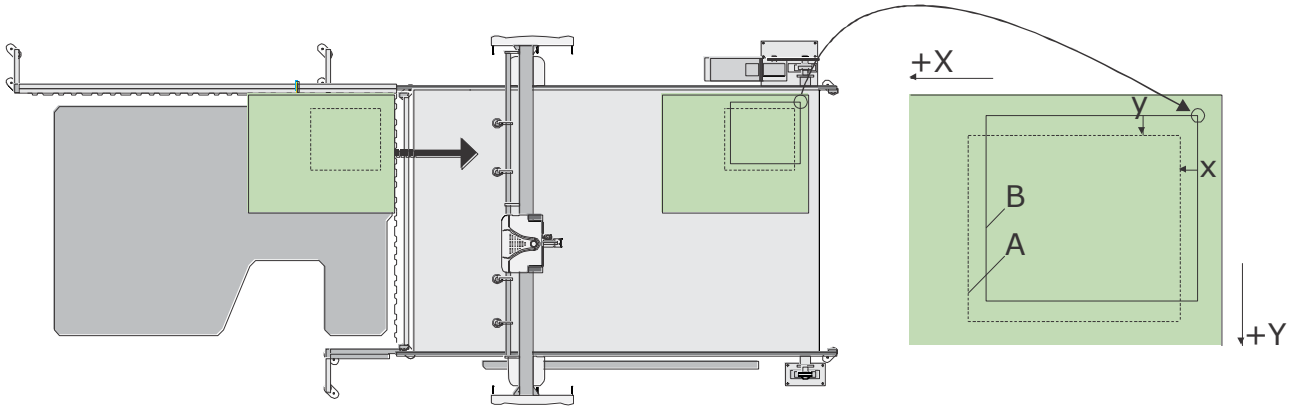

Axis Straightness Step 1 of 3
Place the adjustment template in the instack following the instructions on the template, then press 'Start' to load the template onto the table.
NOTE: Make sure the corner and the leading edge are properly aligned with the instack walls

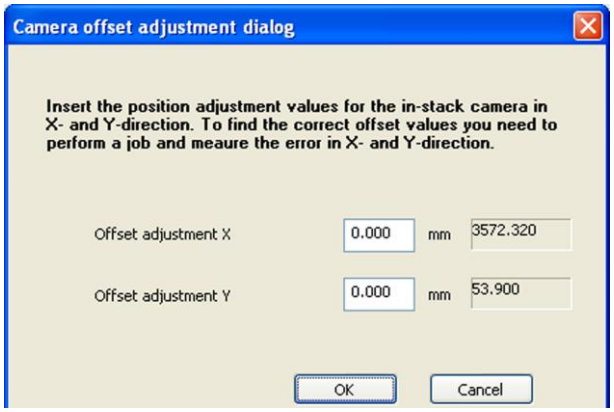
Follow the instructions in the wizard.


Axis Straightness Step 2 of 3
Inspect the camera view and make sure the first circle is perfectly aligned with the camera view center, then press 'Next' to do the axis adjustment.
NOTE: If the first circle is off centre in the camera view, the camera offset is not properly adjusted.

6.12.9 Camera offset adjustment (manual)

For this procedure, run a job and check if the offset adjustment is correct. If there is a deviation between the expected cut path and the real cut path, measure the error and enter the values into the camera offset dialog:
Options->Table option->Adjust Instack ARS-> Camera offset adjustment (manual)




Camera offset adjustment dialog
Insert the position adjustment values for the in-stack camera in X- and Y-direction. To find the correct offset values you need to perform a job and meaure the error in X- and Y-direction.
Offset adjustment X
0.000
mm
3572.320
Offset adjustment Y
0.000
mm
53.900
OK
Cancel

A – Expected cut path

B – real cut path

The x and y arrows indicates the positive direction; enter positive numbers.

7. System setup

7.1 Introduction

This chapter will explain all functions and parameters that are important for the XPA system to run properly.

7.2 Reference Points and Coordinate System

All X and Y coordinates in the **Input File** uses the selected **Reference Point** as origin.

Two modes of operation are available:

1) Fixed reference point

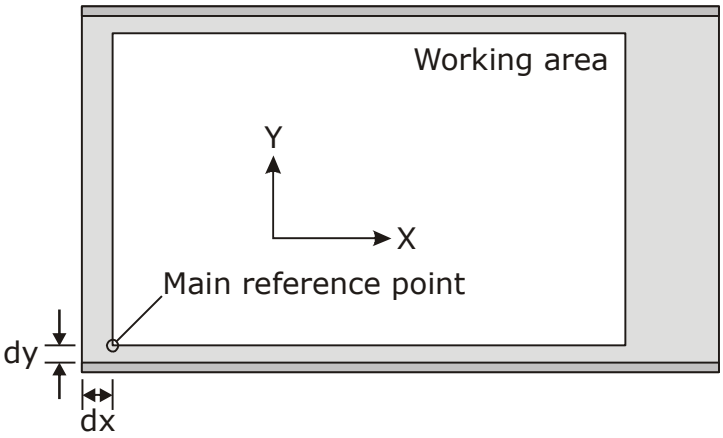
Select a **Reference Point** from the **Select Reference point** drop down list.

2) Panel reference point

- From the **Select Reference point** drop down list, select P**anel Ref Point**.
- Position the Laser pointer at the desired reference point.
- Press ***Init***.

Note: Using the camera below will force use of reference point 1 (**Main Reference point**).

7.2.1 The Main Reference point position



The fixed reference point number 1 is defined as the Main Reference point.

The other fixed reference points (2 – 10) are all specified relative to the Main reference point. Thus, moving the Main reference point will move these reference points as well. The Main reference point has to be correctly positioned in order to obtain:

- A full working area.
- Correct sheet feed operation.
- Correct handling of long jobs

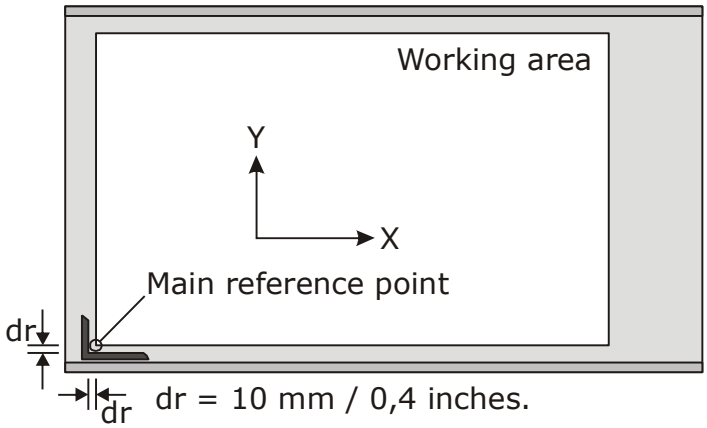
Using the Main reference point during program execution ensures correct operation.

7.2.2 The Main Reference point for i-Cut

For i-Cut to run properly, the Main Reference point should be set in a specific position on the table, using i-Cut reference point setting wizard (93).
After i-Cut reference point setting, do not modify the position of the Main Reference point.
If you need a reference point in another position on the table, use one of the other reference points available (2 – 10).

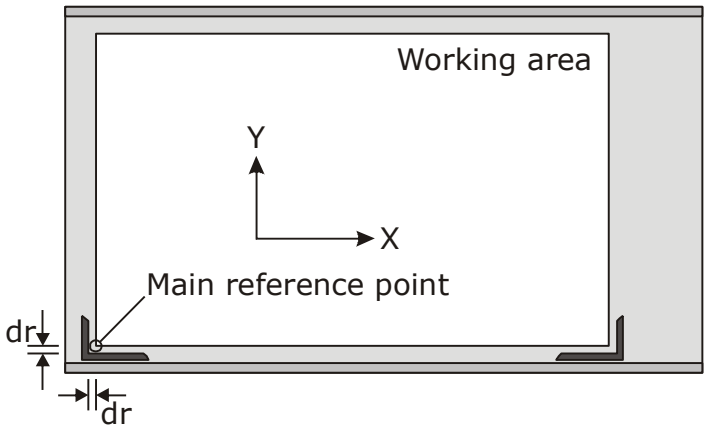
7.2.3 Rulers and reference points

The ruler system ensures an easy and correct positioning of the material on the table.



The Main Reference point shall be defined 10 mm inside the ruler.

When you use the lower right ruler, the Reference Point will automatically be moved to an identical distance from the right ruler, as it is defined from the left ruler. The lower right ruler is normally used for reverse score operations.
At the same time the direction of the X axis is reversed.

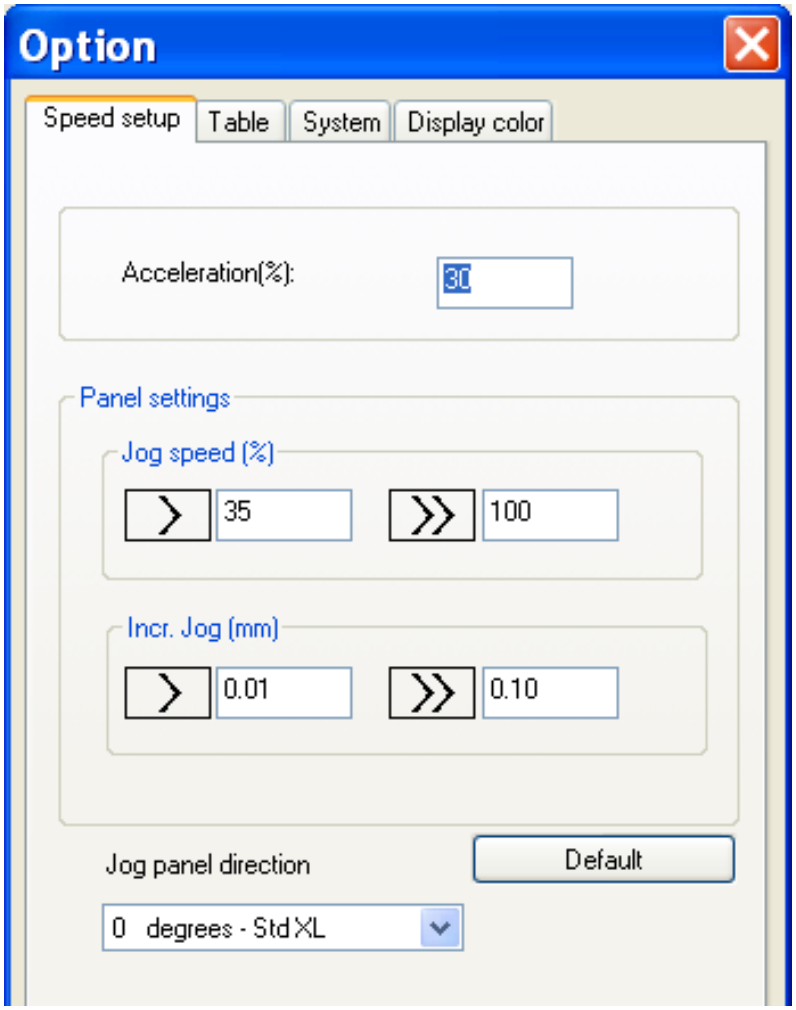


7.3 Speed Setup

The Speed setup dialog is available from:

- **Main Menu->Options->System Option**
- **CTRL+Alt+O**

Select the **Speed Setup** tab.



7.3.1 Table Acceleration

The Table Acceleration can be reduced to a % value of the maximum acceleration.

Enter the wanted value in the **Acceleration** edit box.

7.3.2 Continuous Jog speed

The *Continuous Jog* speed can be reduced to a % value of the maximum jog speed.

Enter the wanted value in the low **Jog Speed** edit box.

Enter the wanted value in the high **Jog Speed** edit box.

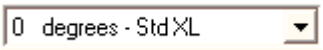
7.3.3 Incremental Jog

The size of the *Incremental Jog* movements can be customized.

Enter the wanted value in the short **Jog Increment** edit box.

Enter the wanted value in the long **Jog Increment** edit box.

7.3.4 Jog directions



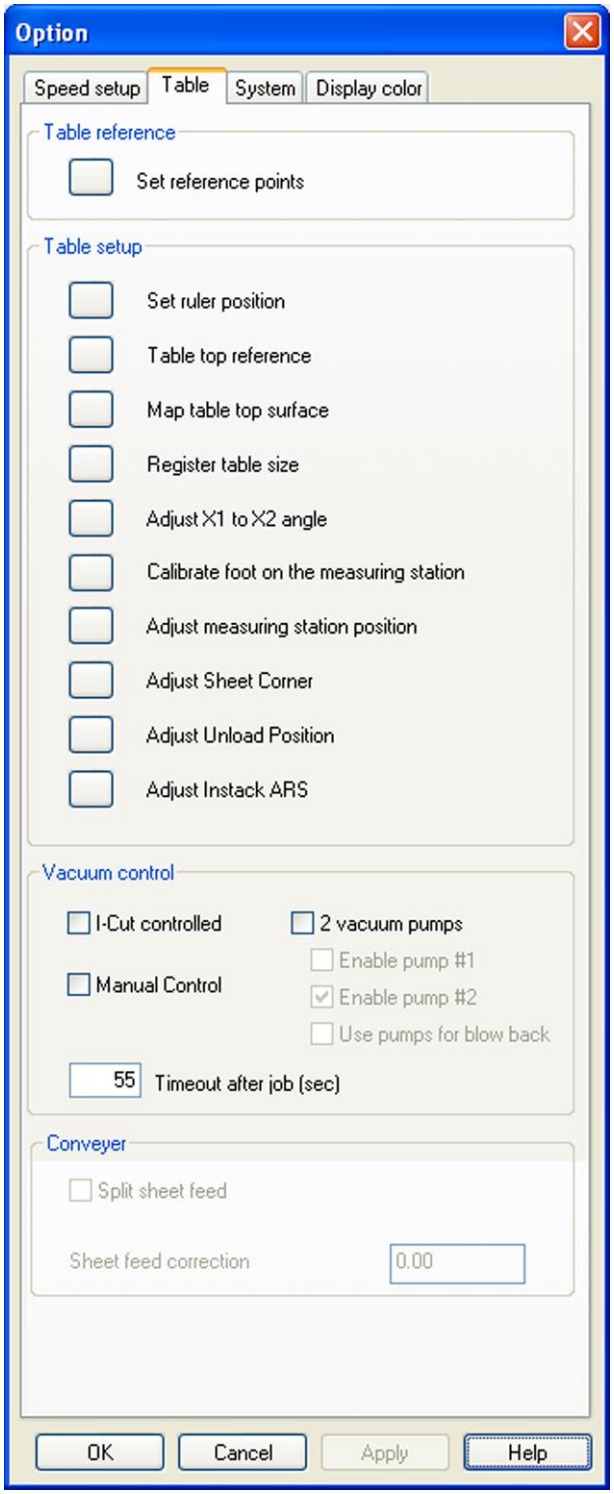
Specify jog direction for the *Manual Jog* buttons on the Operator panel.

7.4 Table setup

The Table setup dialog is available from:

- **Main Menu->Options->Table Option**
- **CTRL+R**

The following selections are available:



7.4.1 Set Reference point

The Set Reference point wizard is an aid for adding or changing the table reference points.

Procedure:
Press the **Set Reference Points** button to set up any fixed reference points. Follow the instructions given by the wizard and define the number of fixed references you want.
As many as 10 points can be defined.
Click the **OK** button.

7.4.1.1 i-Cut Main reference

Press this button to establish the correct Main reference point for i-Cut operations.

7.4.2 Set Ruler Position

If your table is equipped with rulers, please follow the procedure below. If not, enable the "Do not use rulers" - checkbox in the **Set Ruler Position** dialog.

For the table to operate properly an exact registration of the ruler positions is necessary. This is a one time job, but it can be necessary to repeat the procedure if mechanical maintenance has been carried out on the table or traverse.
Correct registration of the right ruler is required when reverse operations are carried out.

Procedure:

Press the **Set Ruler Position** button. Follow the instruction given by the wizard and define the left ruler position.
Repeat the procedure for the right ruler.
Note! When the right ruler is registered, use a position 100 mm out from the corner (marked on the ruler).

7.4.3 Table top reference

Use this function to complete a tool height reference calibration.

The tool height is measured in current position and the reference to the table top surface is updated.
The Table top reference function should be carried out:

- After mechanical adjustments of traverse or tool head.
- When cutting through material is not working properly.
- After any change of cutting / milling underlay, for instance, after adding or removing the milling underlay.

Procedure:

Remove all materials from the table surface. The cutting underlay remains in place.
If the table is equipped with a conveyor belt, avoid measuring directly on the belt junction.
Press the **Table top referenc**e button. In the wizard, press **OK** to start measurement.

7.4.4 Map Table Top surface

To assure correct cutting depth the surface of the table top is measured in order to create a map. It is recommended to execute this function if the cutting mat is worn out and after the cutting mat has been replaced.

Procedure:
If the table is equipped with a conveyor belt, move the belt junction away from the table surface.
Press the **Map Table Top Surface** button. Follow the instructions given by the wizard.

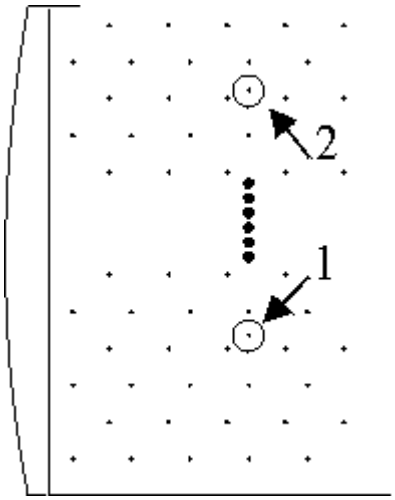
7.4.5 Register Table size

This wizard moves the tool head from edge to edge of the table in order to measure the table size. This registration is normally done just once.

Procedure:
Press the **Register Table Size** button. Follow the instruction given by the wizard.

7.4.6 Adjust X1 to X2 angle

Use this wizard to obtain correct angle between X axis and Y axis.



Procedure:
Press the **Adjust X1 to X2 angle** button. Follow the instructions exactly as given by the wizard.

Note: Use drilled holes in table as reference (see picture).

7.4.7 Calibrate foot on the measuring station

Use this wizard to calibrate the height level of the measuring station.

Procedure:
Press the **Calibrate foot** button. Follow the instruction given by the wizard.

Repeat this procedure after maintenance on the traverse, carriage or measuring station.

7.4.8 Adjust measuring station position

Use this wizard to calibrate the position of the measuring station to the system.

Procedure:
Press the **Adjust measuring station position** button. Follow the instruction given by the wizard.

Repeat this procedure after maintenance on the measuring station.

7.4.9 Adjust sheet corner

Use this wizard to save correct sheet corner position.

Procedure:
Press the **Adjust sheet corner** button.

7.4.10 Adjust Unload position

Use this wizard to specify correct unload position to the system.

7.4.11 Adjust In-stack ARS

Use this wizard to calibrate the In-stack camera (camera below) (78).

7.4.12 Vacuum control

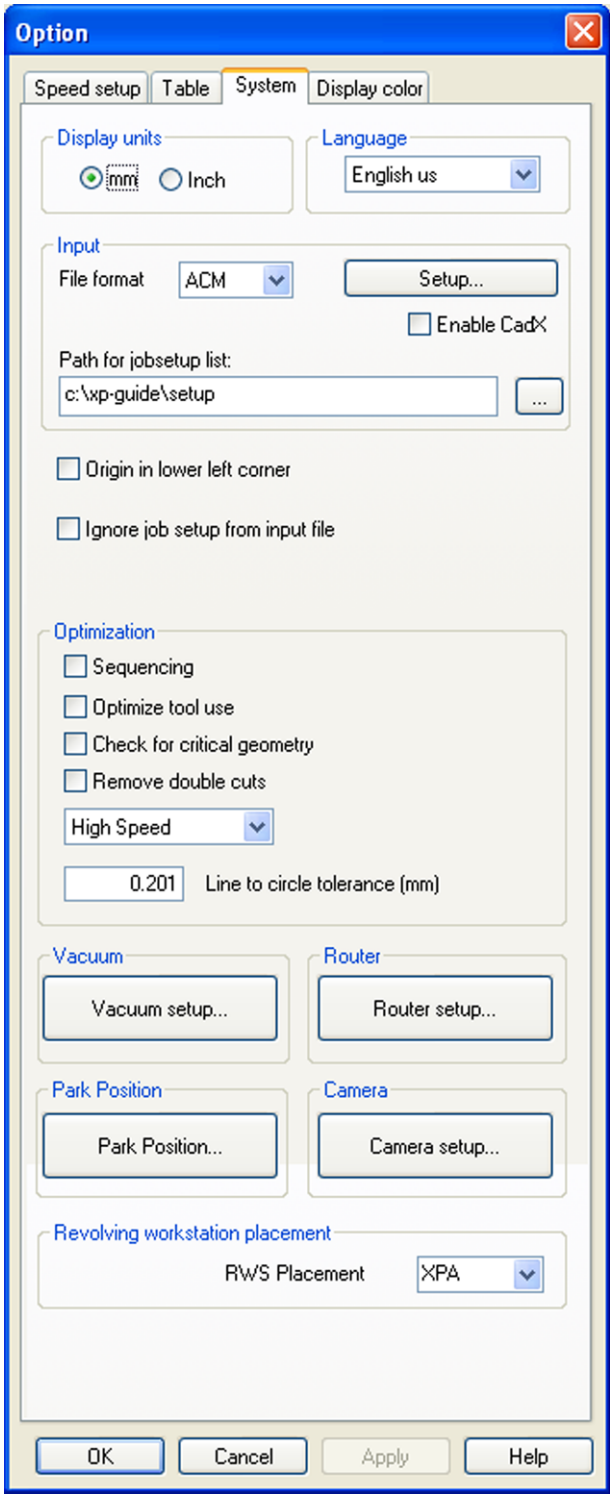
For details about this function, see separate chapter 'Vacuum control' (129).

7.5 System Options

The System option dialog is available from:

- **Main Menu->Options->System Option**
- **CTRL+Alt+O**

Select the System tab. The following selections are available:



7.5.1 Display units

Select unit to be used for the GUI.

7.5.2 Language

Select language for the GUI.

7.5.3 Input File Format

Select one of the available ACM or HPGL formats in the drop down list. ACM is the standard CAM format.

7.5.4 Setup

Enter this dialog for advanced input file format setting.
For ACM and HPGL, use the setup dialog to specify the programming increment for the input file.
For DXF, CF2, DDES, ARD, see ArtiosCAD User manual for more information.

7.5.5 Enable CAD-X

CAD-X enabled allows for the following input formats in addition to the formats mentioned above: DXF, CF2, DDES, ARD. If none of these formats are used, leave the function disabled.

7.5.6 Path for job setup list

Enter the path where job setup files are stored**.**
Default is: c:\xp-guide\setup

7.5.7 Origin in lower left corner

Causes the entire input file coordinates to be offset, using the lower left corner of the job as reference.
The lower left corner of the job will now always be in the selected **Reference Point**.

Note! i-Cut and ArtiosCAD users should leave this function OFF.

7.5.8 Ignore Job Setup from Input file

Inside an **Input File**, it is possible to specify a **Job Setup** file to be used during program execution. Enable this function to ignore the specified **Job Setup** file.

Note: Most CAD systems do not add **Job Setup** file information to the Input File.

7.5.9 Sequencing

This function will sort the input file in order to minimize tool changes.
The execution order will be determined by the tool type, so that pen is executed before crease which is executed before knife.
Some functions depend upon sequencing being active, as reverse score.
Note! i-Cut and ArtiosCAD users should leave this function OFF.

7.5.10 Optimize tool use

This function will reduce the movement with tool up to a minimum, making the execution on the table as fast as possible.
Note! i-Cut and ArtiosCAD users should leave this function OFF.

7.5.11 Check for critical geometry

Optimizes cut directions for reduced paper tear hazards.
Note! i-Cut and ArtiosCAD users should leave this function OFF.

7.5.12 Remove double cuts

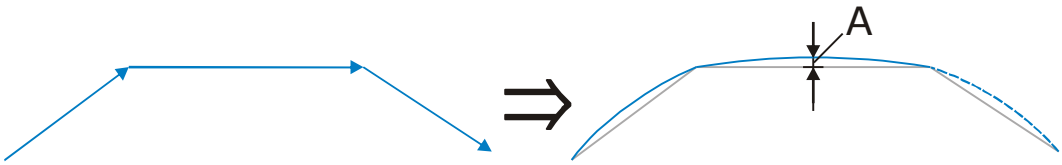
This function will remove any double cuts. Used together with the layout function.

7.5.13 High Quality, Normal, High Speed

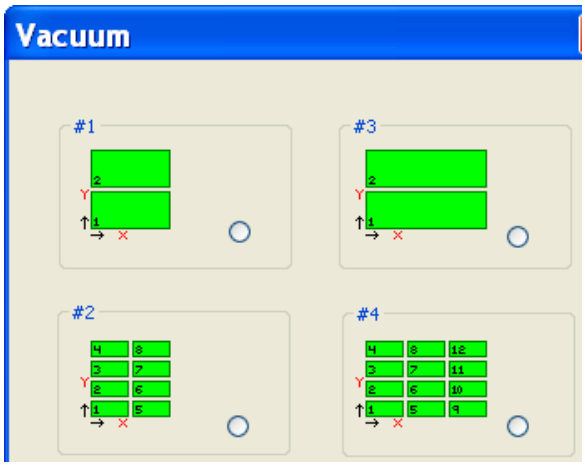
Select mode of operation.

7.5.14 Line to circle tolerance

Specifies the maximum allowed arrow height A when straight lines are converted to circles. Maximum allowed arrow height value is 0.2 mm / 0.08 inch.



7.5.15 Vacuum setup

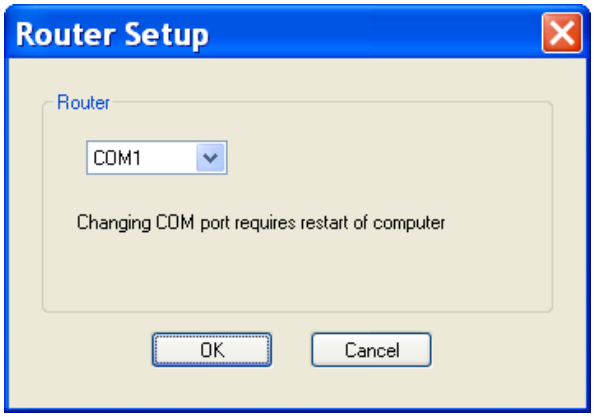


Pressing the **Vacuum Setup** - button opens up a new dialog where the vacuum section configuration for the actual machine is specified.

This setup is a one-time job as long as the vacuum section solution on the machine remains un-changed. The setup should correspond to the actual hardware.

The selected setup will determine which vacuum section configuration that will be available in the user interface.

7.5.16 Router setup



From the **Router Setup** dialog, the physical COM-port used for communication with HSMU/HPMU is specified.

Note
The inverter needs to be connected to a genuine COM port. If connected to a USB-to-COM adapter, the communication will fail.

7.5.17 Park position

Pressing the Park Position - button opens the Set Park Position dialog offering the following functions:

Park position from file	The park position is specified in the CAD system and transferred to XL via the input file.
Go to	Move to the selected reference point after job finished.

reference point after job	
Selectable park position	Enter co-ordinates (X,Y) for the park position. The co-ordinates are relative to the selected reference point.
	Set park position in current position. Press this button to established a park position in current laser pointer position.
Park position at end of job	The park position is in the lower right corner of the rectangle enclosing the job.

7.5.18 Camera setup

Enter the camera setup dialog (134).

7.5.19 Revolving work station placement

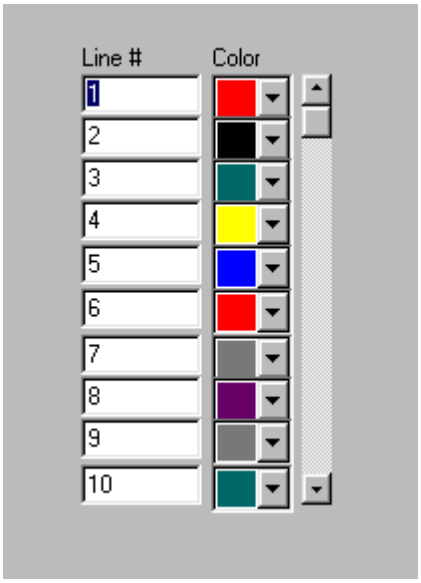
Specify in order to get correct orientation of the Job view picture.

7.6 Display colors

The Display colors dialog is available from:

- **Main Menu->Options->System Option**
- **CTRL+Alt+O**

Select the Display Color tab.



This dialog defines what colors to be used for each line in **Job Setup** when a job is displayed in **Job View**.

Colors are changed by clicking on any of the combo boxes and selecting the wanted color. Additional lines can be added at the bottom of the list.

7.7 Job Setup

7.7.1 Introduction

Job Setup is a table that links Logical tool numbers (P - numbers) in the **Input File** to tools on the machine and describes their behavior.

The **Job Setup** information is stored as a file on the front end PC.

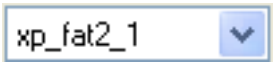
Notes

- All **Job Setup** files must have extension *.mat*
- All **Job Setup** files have the identifier *FMT 2000* as the first line in the Job Setup file.

Typically, the **Job Setup** is different for the different materials used. Therefore, it is recommended to have one **Job Setup** file for each material type used.

7.7.2 Select Job Setup files

Selection of **Job Setup** files is available from:



Select a **Job Setup** file from the drop down list in **Job View**.

Invoke the **Job Setup** dialogue and select a **Job Setup** file from the drop down list in the dialogue.

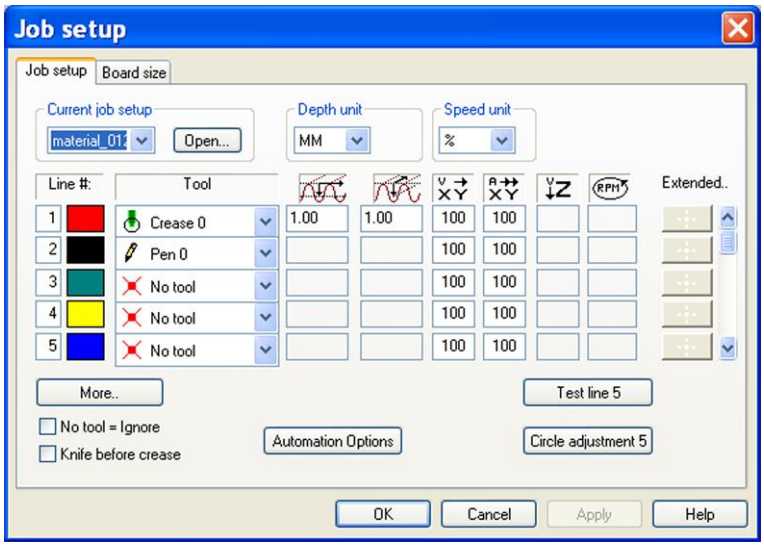
7.7.3 Create and edit Job Setup files

Job Setup is maintained from the **Job Setup** dialogue.

The **Job Setup** dialogue is available from:

- **Main Menu->Options->Job Setup**

- The **Job View** tool bar button.
- Pop up menu in Job View
- **Ctrl + J**



1. Job Setup is edited line by line. The parameters are described below.
2. When finished editing, use the Apply function to save to current or to a new file name.
3. Each line in Job Setup can be tested using the Test Line function**.** Follow the instructions in the dialog.

7.7.4 Job Setup Parameters

7.7.4.1 Depth unit

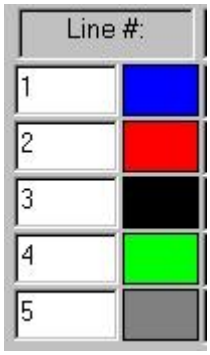
Specify if the depth unit is mm / inch or percentage (%).

7.7.4.2 Speed unit

Specify if the speed unit is mm/min / ips or percentage (%).

7.7.4.3 Line

Logical tools can be numbered from 1 to 99. A maximum of 30 logical tools are available.



The color defined for each logical tool is displayed in **Job View** as shown.

The color for each logical tool number is specified in **Options->System Option**.

7.7.5 Tool

From the drop down list, select the tool to be used for this line.

7.7.6 Depth

Depth can be set either in mm/inch or in % of material thickness.
Different values can be entered for With and Across the Flute.

With the flute

Across the flute

Entering a positive value specifies a depth measured from the top of the material, but:
- For knife cutting, a value = 0 specifies through-cut.
- For pen, crease, drill and router, a value = 0 specifies the top of the material.

If you specify a T+/- value, the value specifies a distance from the cutting underlay. T0 specifies cutting or milling through the material down to the cutting underlay.
A positive T-value will increase the cutting / creasing depth.
Note: The T - function is available only when mm/inch is selected as depth unit.

7.7.7 X/Y speed

The speed can be reduced to an absolute value or to a percentage (%) of maximum speed, depending upon the 'Speed unit' setting.
This value affects tool down movements only.

7.7.8 X/Y acceleration

The acceleration can be reduced to a percentage (%) of the maximum acceleration.
This value affects tool down movements only.

7.7.9 Z-axis Speed

The speed can be reduced to an absolute value or to a percentage (%) of maximum speed, depending upon the 'Speed unit' setting.

7.7.10 RPM

Specify RPM for the HSMU/HPMU spindle.

7.7.11 No tool = Ignore

This function specifies the behavior of lines with tool type 'No-tool':
Function disabled - the line is executed using laser pointer (verify mode).
Function enabled - the line is ignored during program execution (ignore mode).

7.7.12 Knife before crease

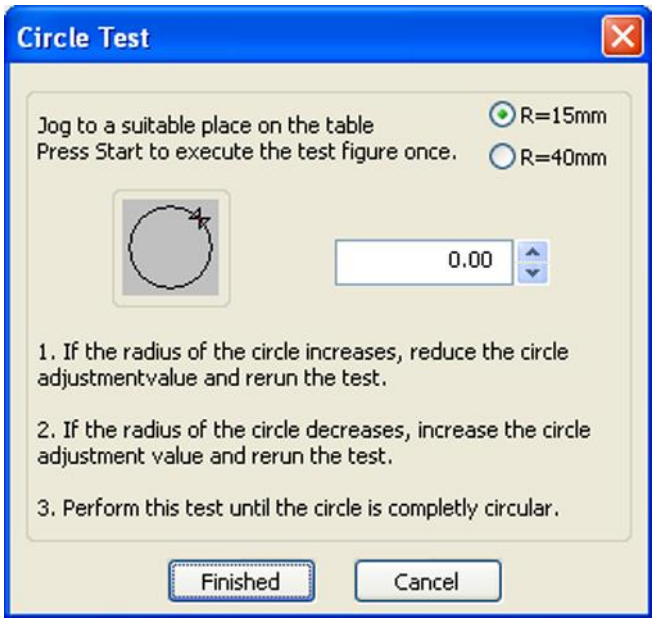
Use this function to force all knife movement to be executed before the crease movements.

Normally this option should be turned off. It is recommended to use this option if the crease lines are done with a V-Notch tool.

7.7.13 Test line n

Select this function to execute a test figure with the selected tool n.
The figure executed is a square 40 x 40 mm (1.6 x 1.6 inches).
Use this function as a quick way to verify correct adjustments for the different tools.

7.7.14 Circle adjustment line n


Circle Test
Jog to a suitable place on the table
Press Start to execute the test figure once.
R=15mm
R=40mm
0.00
1. If the radius of the circle increases, reduce the circle adjustmentvalue and rerun the test.
2. If the radius of the circle decreases, increase the circle adjustment value and rerun the test.
3. Perform this test until the circle is completly circular.
Finished
Cancel

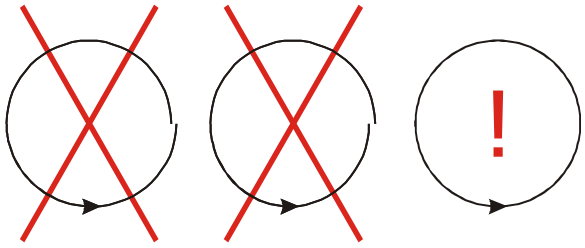
The **Circle lag** parameter determines the quality of circles when cutting with knife.

The value will be different for different materials.

Complete this wizard to obtain a proper adjustment of the **Circle lag** parameter.

Select between two different circle sizes, R=15 and R=40 mm.

Note: We recommend that the **Circle lag** value is set to 0 before the first figure is executed.

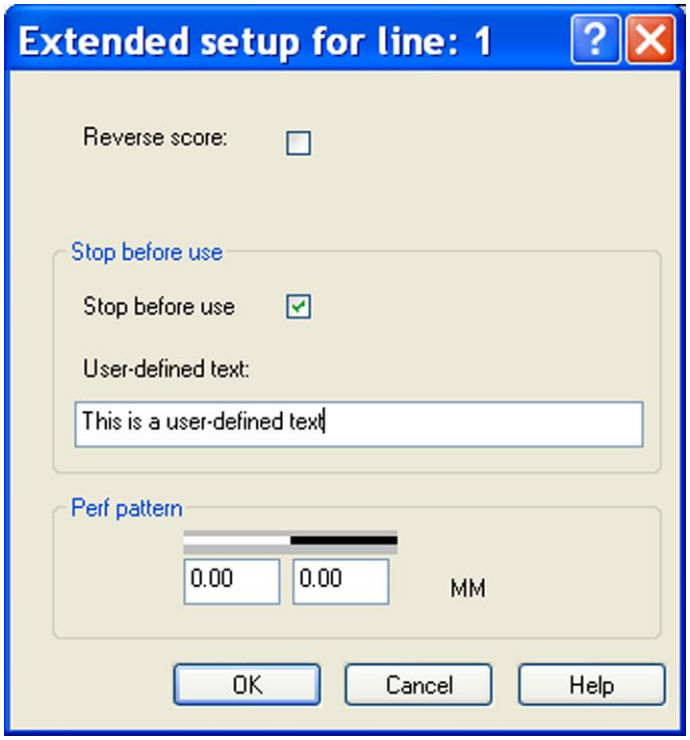


7.7.15 Extended..

For each line in Job Setup, an extended setup is available:

- This button face indicates that some of the extended parameters are set.

- This button face indicates that none of the extended parameters are set.



The extended parameters are:

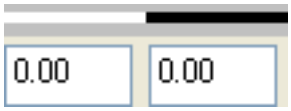
7.7.15.1 Reverse score

Enable this check box to specify that the tool shall work on the front side of the material.

7.7.15.2 Stop before use

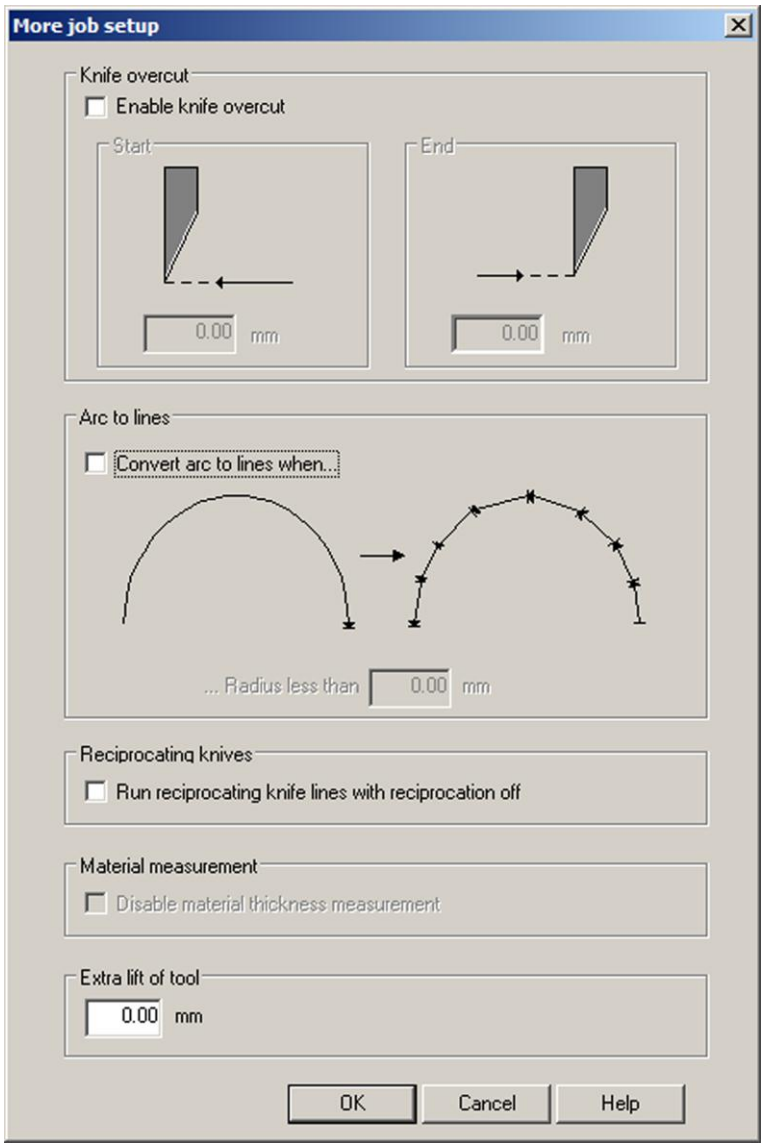
When this function is enabled, the execution will stop at the beginning of this line and an operator message is displayed.
The text to be displayed is entered into the **User-defined text:** – field.

7.7.15.3 Perf pattern



Specify a perforating pattern in the two edit boxes. The first specifies a tool up length and the second a tool down length.

7.7.16 More



The following functions are available through the **More** button:

7.7.16.1 OverCut

Check this box to enable or disable the Knife Over-cut function.
Specify the size of the over-cut at start and end of consecutive cut lines.
When the direction change between two consecutive lines is bigger than 13.5 degrees, an over-cut corner action is performed.

7.7.16.2 Curve to Line

Over-cut and Curve to Line will apply to knife tools only. The radius is the maximum radius where Curve to Line function will be executed. The angle parameter for straight line will be fixed. The main purpose of this function is to minimize angular and sideways forces to the cutting knife. This is achieved by splitting circles into straight lines, lifting and rotating the knife in upper position, and lowering the knife into the material where there is no cut before.
For straight lines, the knife will be lifted in the corner between the two lines, and moved to the end of the second line. There, the knife will be lowered to cut back to the first line.

7.7.16.3 Reciprocating knife with motor off

Enable the function: 'Run reciprocating knife lines with reciprocation off' to run the Reciprocating knife with motor switched off.

7.7.16.4 Disable material thickness measurement

When this function is enabled, no material thickness measurement is carried out.
The following rules apply:

- In Job setup, the **T** – function must be used for depth settings.
- In Job setup, the **Depths unit** must be set to mm/inches (Percent not allowed).
- During tool up movements, the knife is lifted to its top position.

Note: This function is for knife tools only.

7.7.16.5 Extra lift of tool

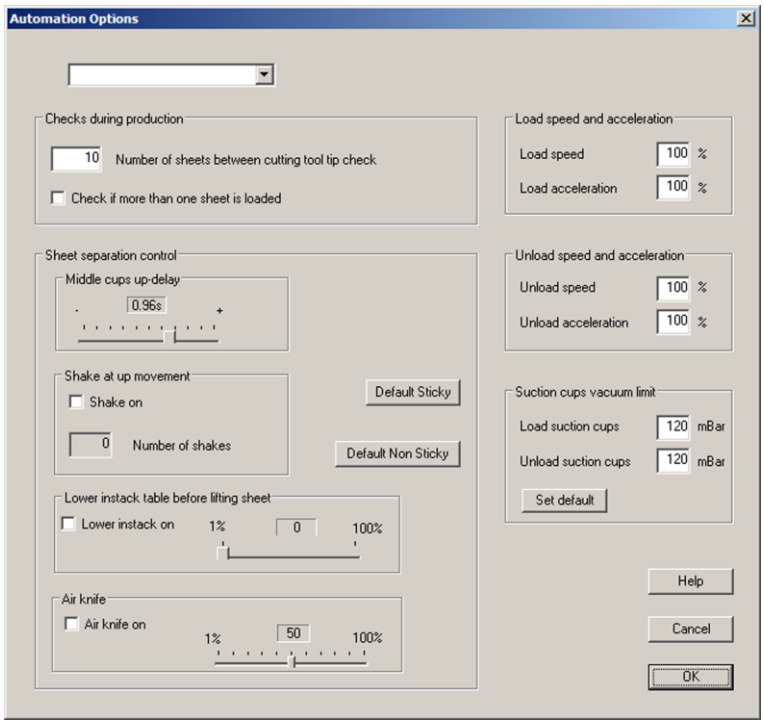
Add extra lift height to tools when moved in up position. Useful for warped boards or uneven surfaces.

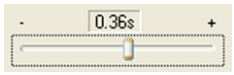
7.8 Automation options

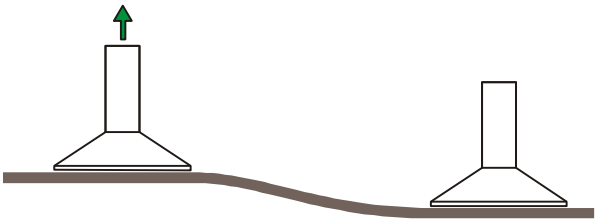
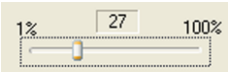
The **Automation options** dialogue is available from:

Job view tool bar->Automation Options

7.8.1 Settings for XPA load and unload functions



	Select **Automation options** file from the drop down list.
Number of sheets between cutting tool tip check	Check for broken knife tip. Specify the number of sheets to be processed between each check of the cutting tool tip.
Check if more than one sheet is loaded	When this function is enabled, the machine will stop and a warning message is displayed if the measured material thickness indicates that two sheets on top of each other has been loaded.
Middle cups up delay 	In order to improve In-stack sheet separation, the up movement of the load cups in the middle can be displaced compared to the outer suction cups. Positive value = middle suction cups are delayed compared to outer. Negative value = outer suction cups are delayed compared to middle.

	 Depending upon the material, there is a risk for material tear when using the cups delay function. To avoid this, reduce the delay to a minimum.
Shake at up movement	In order to improve In-stack sheet separation, the up/down movement of the load cups can be repeated (shake). The number of shakes is specified by:
Number of shakes	Specify the number of extra shakes
Default sticky	This is the factory default setting for separating sticky material.
Default non sticky	This is the factory default setting when no extra sheet separation functions are selected.
Lower In-stack table before lifting sheet	In order to improve In-stack sheet separation, the In-stack load table is lowered during the load sequence.
Air knife on	In order to improve In-stack sheet separation, pressurized air is forced in between the upper sheets in the In-stack. The blow duration is specified by:
	Air knife duration.
Load speed	Specify XP traverse speed reduction when loading sheets from the In-stack.
Load acceleration	Specify XP traverse acceleration reduction when loading sheets from the In-stack.
Unload speed	Specify Unload traverse speed reduction when unloading sheets from the cutting table.
Unload acceleration	Specify Unload traverse acceleration reduction when unloading sheets from the cutting table.
Suction cups vacuum limit	Specify at which level the suction cups should be lifted. Use this function to improve sheet separation functionality.

7.8.2 Saving Automation option settings

If you, from the **Automation options** dialog, modifies any parameter and press **OK**, a Save As dialog appears.
The **Automation options** files are by default stored and fetched from the folder c:\xp-guide\system.

7.9 Input Files and available formats

From **File View**, open **Input Files** in one of following ways:

	Double click on a file.
	Select a file and click the **Open** button.
	Click on a file, hold the left mouse button down, drag the file into **Job View** and release it.
	When **Auto Open** is enabled and activated the files will be opened automatically (223).

The formats available are:

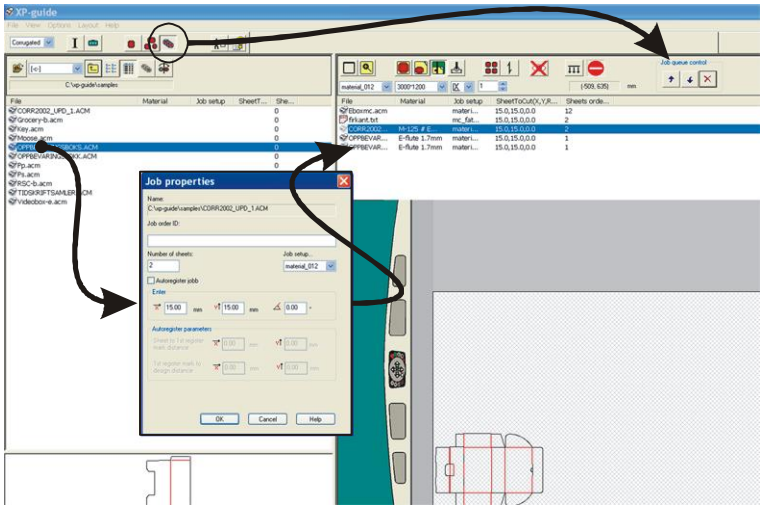
File extension	**Description**
.acm	Kongsberg acm – format. This is the default input format for Kongsberg XP. Described in the Technical Reference manual for XP.
.plt	HPGL. Described in the Technical Reference manual for XP.
.dxf	DXF. See Appendix about DXF input tuning (234).
.ard	ArtiosCAD. See Appendix about the ArtiosCAD module CAD-X (234).
.cf2	CF2. See Appendix about the ArtiosCAD module CAD-X (234).
.ddes	DDES. See Appendix about the ArtiosCAD module CAD-X (234).

The format is selected from the System Setup dialog (96).
Standard file extensions will be automatically recognized.

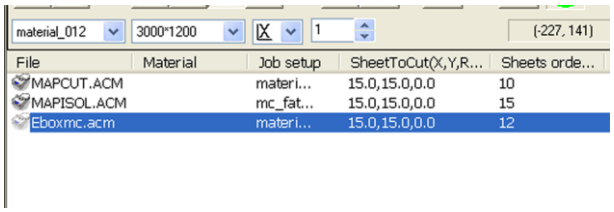
7.10 Queue input mode

Available from **Main toolbar->Queue Input mode.**

It is a pre-requisite that **Main toolbar->Manual Load** is disabled.



When the **Queue input mode** is selected, files opened are added to a queue.



The queue is displayed in the upper part of **Job view**.

When an input file is opened in the **Queue input mode**, a **Job property** dialog is displayed before the job is added to the input queue, see next chapter (111).

The job properties can be altered by double clicking on a job in the queue.

The first design in the queue will be placed on the table automatically.
This job will be started when the *Start* button is pushed. When all sheets are made for a job it will be deleted from the queue and the next one is placed on the table. The machine will not stop until all jobs in the queue are finished.

Note: Be aware that to make Queue input mode work all jobs should be run with the same sheet size.

When **Queue input mode** is selected, the **Queue design** buttons are available from the **Job view toolbar:**

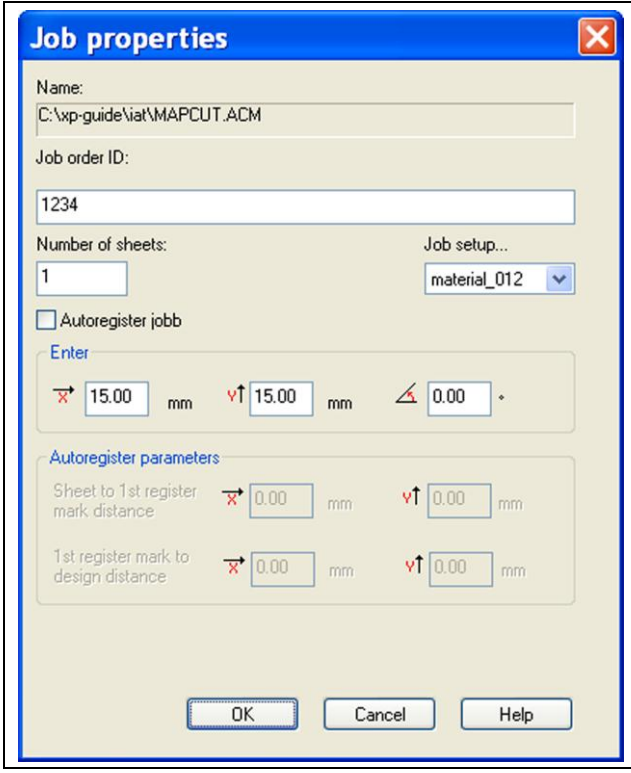
Select a job in the queue by a single mouse-click, and modify the queue in this way:

Move selected job up

Move selected job down

Remove selected job from queue.

7.10.1 Job properties



Use this dialog to enter/modify properties for jobs in the Input queue.

The dialog is available when:

- A file is opened when the system is in the **Queue input** mode.
- You double-click on a file in the queue.

7.10.1.1 Name

This field displays the full name of the job.

7.10.1.2 Order ID

Enter a text string to identify this job. The string will appear on the job report

7.10.1.3 Number of sheets

Enter wanted number of sheets for this job.

7.10.1.4 Job setup

Select wanted job setup file to be used when executing this job.

7.10.1.5 Enable ARS functions

Turns ARS functions on and off.

7.10.1.6 Sheet to Cut adjustment

This entry is available when the ARS function is disabled.
Specify the distance from the sheet corner to the design. Click here for a detailed description.

7.10.1.7 ARS settings

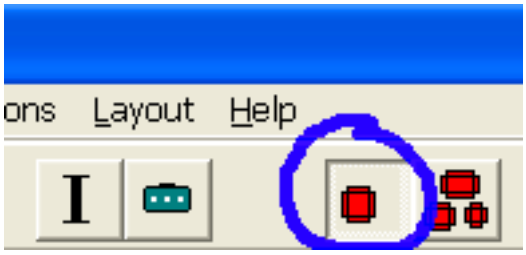
These entries are available when the ARS function is enabled.

- **Sheet to 1st register mark**
  X and Y coordinates of the first register mark referred to the sheet edge.
- **1st register mark to design**
  X and Y coordinates of the design reference referred to the first register mark

7.11 Job Layout

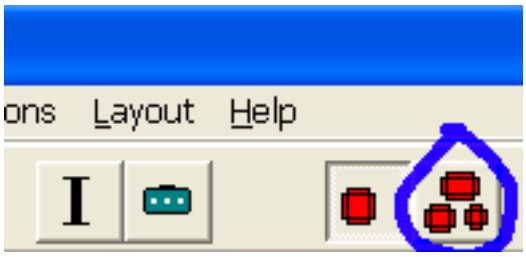
XP-Guide can operate in either Single Design Layout mode or Multi Design Layout mode

7.11.1 Single Design Layout



Press the Single Design Button to select **Single Design** layout mode.
When a design is opened in this mode it is always located relative the selected reference point. Only one design can be placed on the table. It can be further manipulated with **Rotation**, **Scaling** or with **Step and repeat**.

7.11.2 Multi Design Layout



Press the Multi Design Button to select **Multi Design** layout mode.
When a design is opened from File view, the first design will be located relative to the reference point as in single design layout. The following designs will be placed according to the settings of the Job Layout Snap function.
If a design is opened using drag and drop, it can dropped anywhere inside **Job View**.
The bar on top of **Job View** is showing the name of the selected design.

Note:

- By using the Multi Design functions, you can locate your design anywhere inside the **Job View** area. The red and green "traffic light" will show if the work is inside the work area boundaries or not.
- A combination of Multi Design and ARS is not supported.

7.11.3 Multi design layout functions

Note: All functions described here are available from **Main Menu->Layout** and from the Pop-up menu in Job view.

7.11.3.1 Select a design

A selected design is always shown in pink. After a design is opened it is always selected. It can also be selected by clicking on a line in the design or holding the left mouse button down and drag a square over the designs to select.

7.11.3.2 Select all designs

All designs are selected with **Ctrl+A** or by selecting **Select All** from the menus.

7.11.3.3 Delete selected designs

Selected designs are deleted by pressing the **Del** key or by selecting **Delete** from the menus.

7.11.3.4 Delete all designs

All designs are deleted selecting the menu item **Delete All.**

7.11.3.5 Rotate selected designs

Selected designs can be rotated with the functions **Rotate 90**, **Rotate 180** or **Rotate.**

7.11.3.6 Positioning selected designs with the mouse

Selected designs can be positioned by holding the left mouse button down on a selected element and move the mouse. They can be dropped anywhere or snapped to existing designs depending upon the Snap function settings.

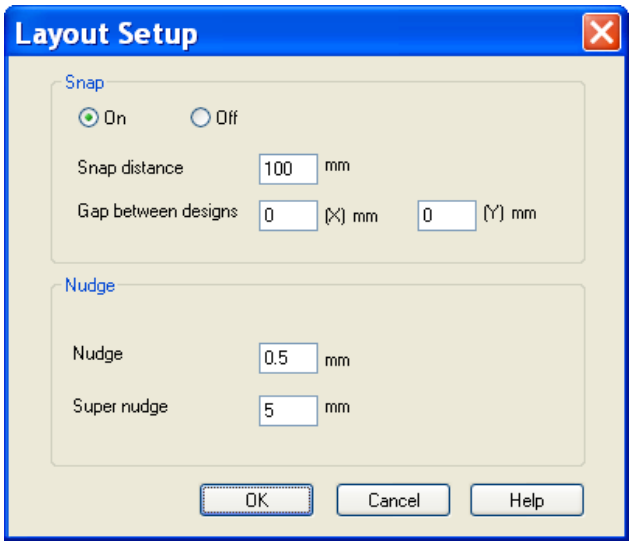
7.11.3.7 Positioning selected designs with the arrow keys

Selected designs can be positioned with keyboard arrows and placed in the JobView depending upon the Snap function settings.
The step size is defined in **Job Layout Setup->Nudge.**

7.11.3.8 Step and repeat on selected designs

In **Multi Design** layout, **Step and Repeat** works on selected designs only.

7.11.4 Job Layout Setup



Job Layout setup is available from **Main menu->Layout** or **Ctrl+L.**

7.11.4.1 Snap

The snap function is turned on and off by ticking the radio buttons on and off.

7.11.4.2 Snap distance

When the snap function is on, a design will be snapped to another design if it is positioned closer than the snap distance.

7.11.4.3 Gap between designs

This parameter defines the distance between designs after a snap function is completed.

7.11.4.4 Nudge

Fine positioning with the arrow keys on the keyboard.

7.11.4.5 Nudge step

Defines the step the design is moved with when pressing an arrow key.

7.11.4.6 Super nudge step

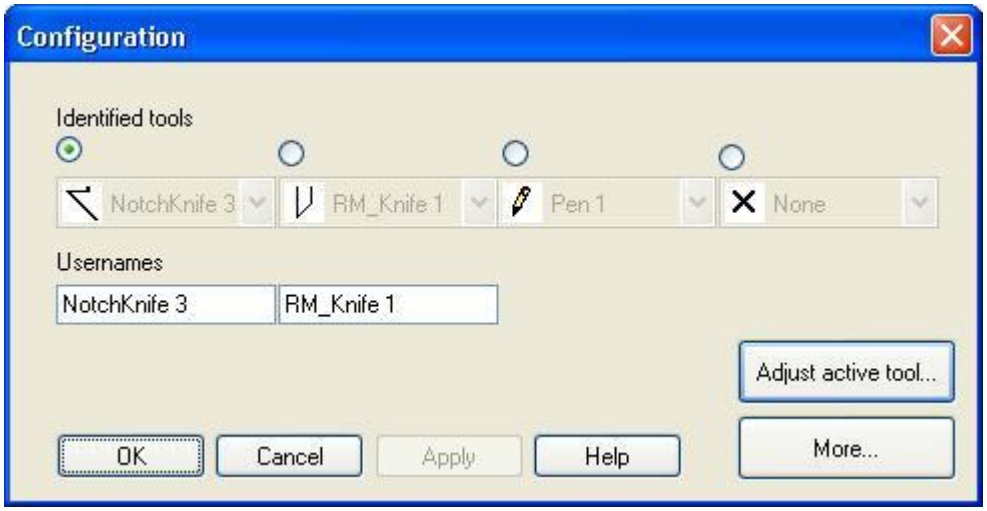
Defines the step the design is moved with when pressing an arrow key together with the Shift key.

7.12 Tool Configuration and Adjustment

The **Tool Configuration** dialog is used for all tool settings and adjustments.

The dialog is available from:

- **Main Toolbar->Tool Configuration**
- **Main menu->Option->Tool Configuration**
- **Ctrl + T**



7.12.1 Tool configuration and user names

The tool type mounted is identified by hardware codes in each tool.

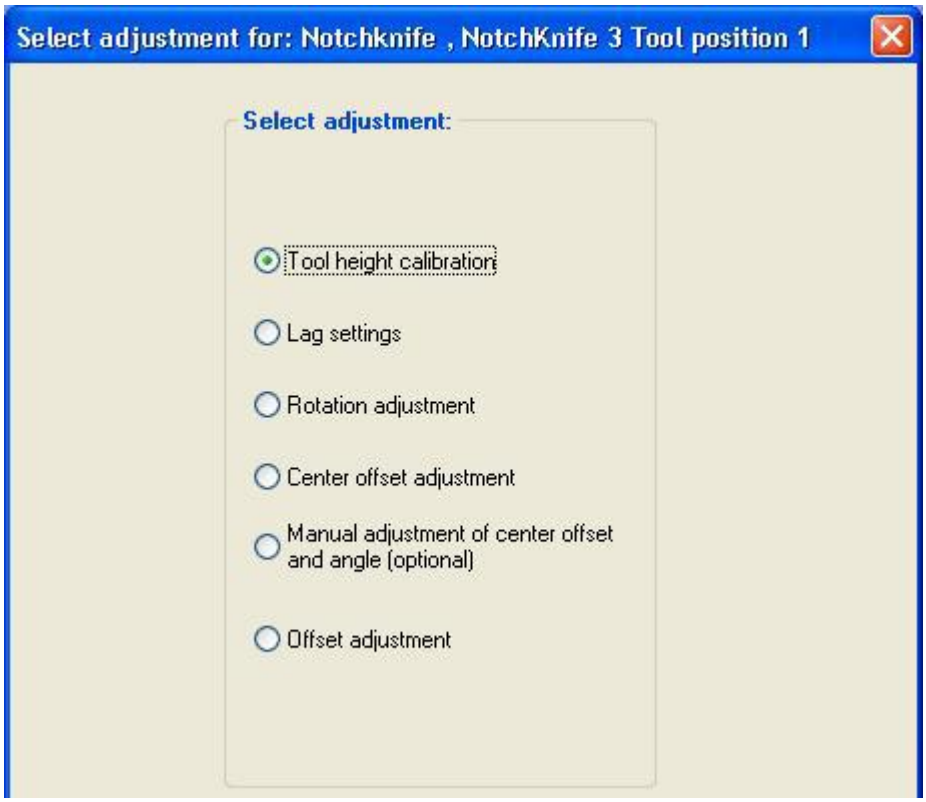
Current tool configuration is displayed under **Identified tools**.

When a new tool is inserted, it will be identified to the system automatically.

Use the **Usernames** edit boxes beneath each drop down box to give each tool a nickname you want to associate the tool with.
By default the system creates a username from the tool type and its serial number. F.ex a knife with serial number 3020 will be named **Knife 20**

All tools need to be adjusted in the position they will be used.

7.12.2 Adjust Active Tool

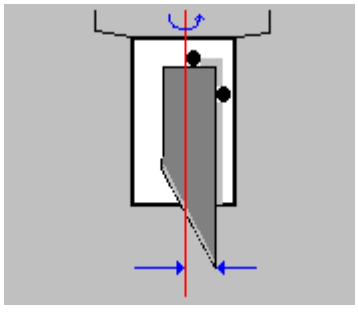

Select adjustment for: Notchknife , NotchKnife 3 Tool position 1
Select adjustment:
Tool height calibration
Lag settings
Rotation adjustment
Center offset adjustment
Manual adjustment of center offset and angle (optional)
Offset adjustment

From the **Adjust Active Tool** – dialog, all tool adjustment wizards are executed.

The following procedures are general descriptions of how to adjust the tools. See the description of each tool type for more specific information:

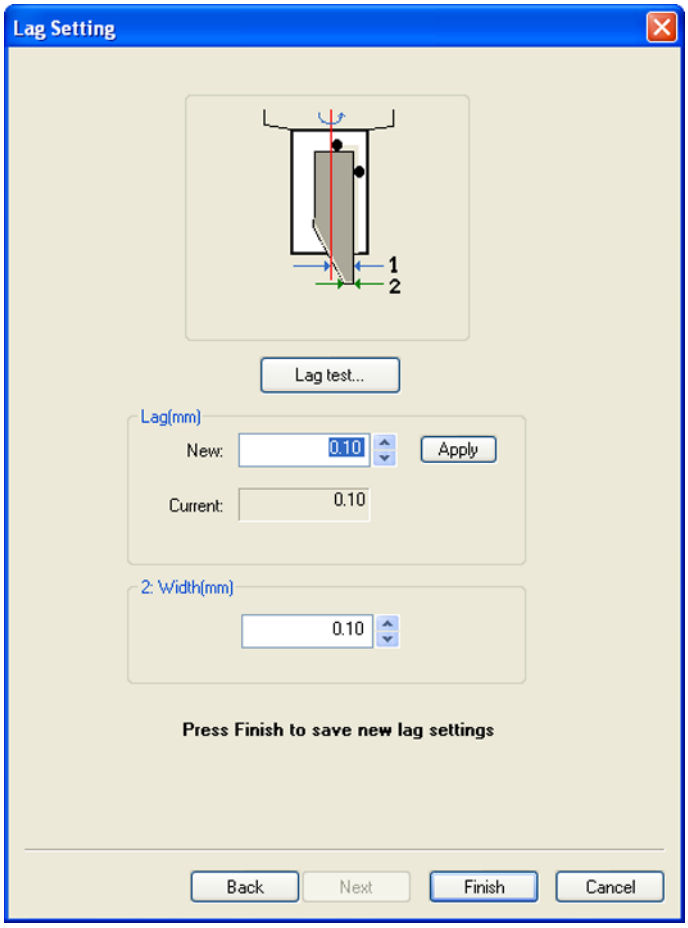
We recommend using a sheet of corrugated material, 5-6 mm / 0.2 inch, when executing the adjustments.
Before any adjustment, complete a **Table Top Reference** function.

7.12.2.1 Lag settings (for rotating tools)



1. Select the tool to be adjusted.
2. Press the **Adjust active tool** button to enter the wizard selection dialog.
3. Select **Lag settings**.
4. Follow the instructions given to enter correct values (118).
5. Repeat the procedure for all rotating tools.

Lag setting dialog

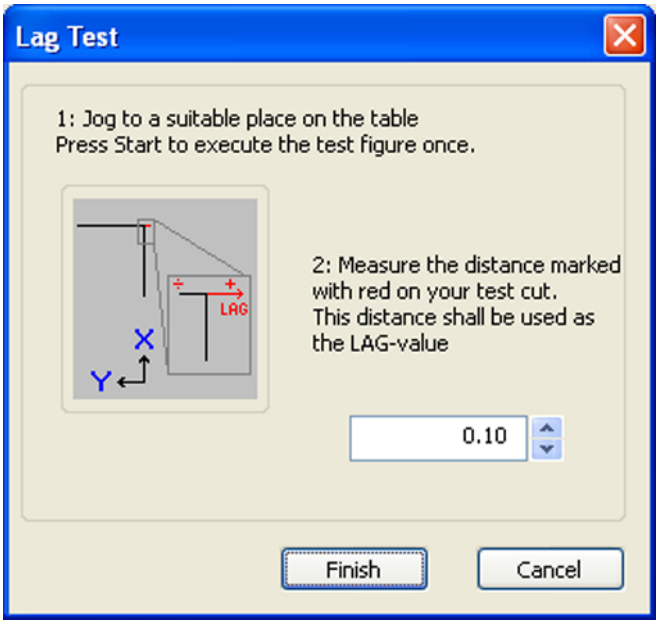


Lag test – see next picture

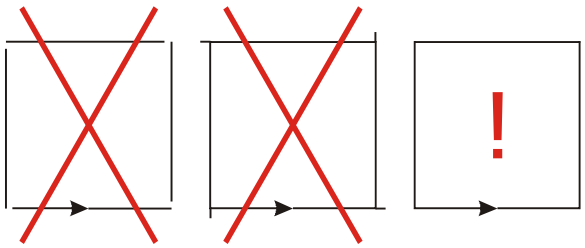
Lag – lag value. This is the distance from the rotation center to the back of the knife blade.

Enter the value as measured or as found using the Lag test.

Width – knife bottom width
Enter the measured knife bottom width.


Lag Test
1: Jog to a suitable place on the table
Press Start to execute the test figure once.
LAG
X
Y
2: Measure the distance marked with red on your test cut.
This distance shall be used as the LAG-value
0.10
Finish
Cancel

Lag test
Run this wizard to obtain correct lag value.
Follow the instructions in the dialog.
Add the measured value to the displayed value.



Circle lag

Circle quality is determined by a parameter called **Circle lag**. The parameter value will vary depending upon the actual material. Therefore, the adjustment is located in the Job setup dialog (103).

7.12.2.2 Tool height calibration

Knife blades are extremely sharp!

XP is equipped with an **Automatic tool height calibration** system. Therefore, the system will run without any manual height calibration.
If you, for any reason, would like to add an offset to the measured height, use the **Tool Height Calibration** dialog:

1. Select the tool to be adjusted.
2. Press the **Adjust active tool** button to enter the wizard selection dialog.
3. Select **Tool height calibration**.
4. Follow the instructions given by the wizard, step by step.
5. Repeat the procedure for all tools.

7.12.2.3 Rotation adjustment (for rotating tools)

Knife blades are extremely sharp!

Optimal Angular offset may vary with different material strength and thickness.
The adjustment can be done using the adjustment wizards, or by a manual adjustment procedure:

Wizard adjustment

1. Select the tool to be adjusted.
2. Press the **Adjust Active tool** button to enter the wizard selection dialog.
3. Select **Rotation adjustment.**
4. Follow the instructions given by the wizard, step by step.
5. Repeat the procedure for all tools in the toolhead.

Manual adjustment

1. Put an appropriate test material on the table, and switch vacuum on.
2. From the **Tool Configuration dialog**, select one tool.
3. Press the **Adjust Active tool button** to enter the wizard selection dialog.
4. Select **Manual adjustment** of center offset and angle.
5. Enter value for the Angular offset and select **Activate**.
6. Note that the tool will rotate as the new value is activated.
7. Press ***Tool override down***, and Jog approximate 10 cm to make a test cut.
8. Press ***Tool override down*** once more to lift the tool again.
9. Press ***Tool override down*** once more to lower the tool again.
10. Note how the knife enters into the material.

11. Press ***Tool override down*** once more to lift the tool again.
12. If knife enters exact into the cut, the angle is correct, select **Finish** to exit.
13. If seen in the cutting direction, the knife enters to the left of the cut, the Angular offset value should be decreased. Repeat from point 5.
14. If seen in the cutting direction, the knife enters to the right of the cut, the Angular offset value should be increased. Repeat from point 5.

7.12.2.4 Center Offset adjustment

Knife blades are extremely sharp!

The adjustment can be done using the adjustment wizards, or by a manual adjustment procedure:

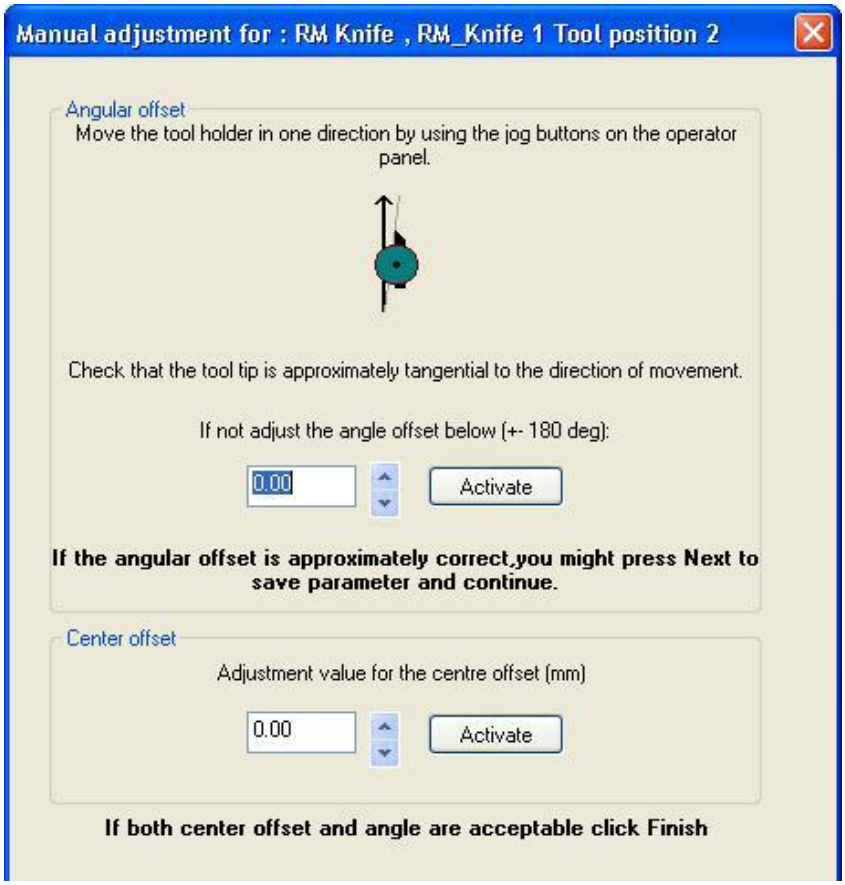
Wizard adjustment

1. Put an appropriate test material, that means a thin paper on the table (any significant material thickness will create a misleading offset in this wizard), and switch vacuum on.
2. Select the tool to be adjusted.
3. Press the **Adjust Active tool** button to enter the wizard selection dialog.
4. Select **Center Offset Adjustment**.
5. Follow the instructions given by the wizard, step by step.

Manual adjustment

1. Put an appropriate test material on the table, and switch on the vacuum.
2. From the **Tool Configuration dialog**, select one tool.
3. Press the **Adjust Active tool button** to enter the wizard selection dialog.
4. Select **Manual adjustment** of center offset and angle.
5. Enter value for the **Center offset** and select Activate.
6. Note that the tool will move as the new value is activated.
7. Press ***Tool override down***, and Jog approximate 10 cm, to make a test cut.
8. Press ***Tool override down*** once more to lift the tool again.
9. Press the ***Jog button*** for the return direction shortly, just to turn the tool.
10. Press ***Tool override down*** once more to lower the tool again, and Jog the same distance back.
11. Press ***Tool override down*** once more to lift the tool again.
12. Measure the distance between the two cuts.
13. As a guideline, the distance should be 2 x material thickness.
14. If exact, the Center offset is correct, select Finish to exit.
15. If greater, the Center offset value should be increased. Repeat from point 5.
16. If less, the Center offset value should be decreased. Repeat from point 5.

7.12.2.5 Manual adjustment of Center Offset and angle


Manual adjustment for : RM Knife , RM_Knife 1 Tool position 2
Angular offset
Move the tool holder in one direction by using the jog buttons on the operator panel.
Check that the tool tip is approximately tangential to the direction of movement.
If not adjust the angle offset below (+- 180 deg):
0.00
Activate
If the angular offset is approximately correct,you might press Next to save parameter and continue.
Center offset
Adjustment value for the centre offset (mm)
0.00
Activate
If both center offset and angle are acceptable click Finish

Sometimes it might be necessary to fine-tune the adjustments obtained using the wizards.

Use this dialog to modify the adjustment values for angle and center offset.

1. Select the tool to be adjusted.
2. Press the **Manual adjustment of....** button to enter the adjustment dialog.
3. Key in or use the up/down arrows to specify the wanted offset.
4. Press Activate to enter the value.
5. Test the new settings.

Note:
All XP tools should, by default, be close to correct angle when the adjustment value is 0. The **Manual adjustment of....** function is useful if you want to test a tool for correct behavior before program execution.

7.12.2.6 Offset adjustment

1. Select the tool to be adjusted.
2. Press the **Adjust Active tool** button to enter the wizard selection dialog.
3. Select **Offset Adjustment**.
4. Follow the instructions given by the wizard, step by step.
5. Repeat the procedure for all tools in the tool head.

7.12.3 More...

NOT VALID

The More... button opens the More.. dialog, which contains selections to ignore, delete or add to the tool list. The tool list contains tools that you can select for the tool positions.

7.12.4 Ignore the automatic tool identification

NOT VALID

The **Ignore the automatic tool identification** may be used when the automatic tool detection fails, and manually tool selection is necessary. Tick the box to avoid changing the tool setup when zero point sequence is running or tool identification button is selected.

7.12.5 Delete tools

The selection Delete tools may be selected when a tool is no longer in use. For example when the tool is returned to factory or is malfunctioning. The button Delete the tool remove the tool selected in the Tool dropdown list from the tool list.

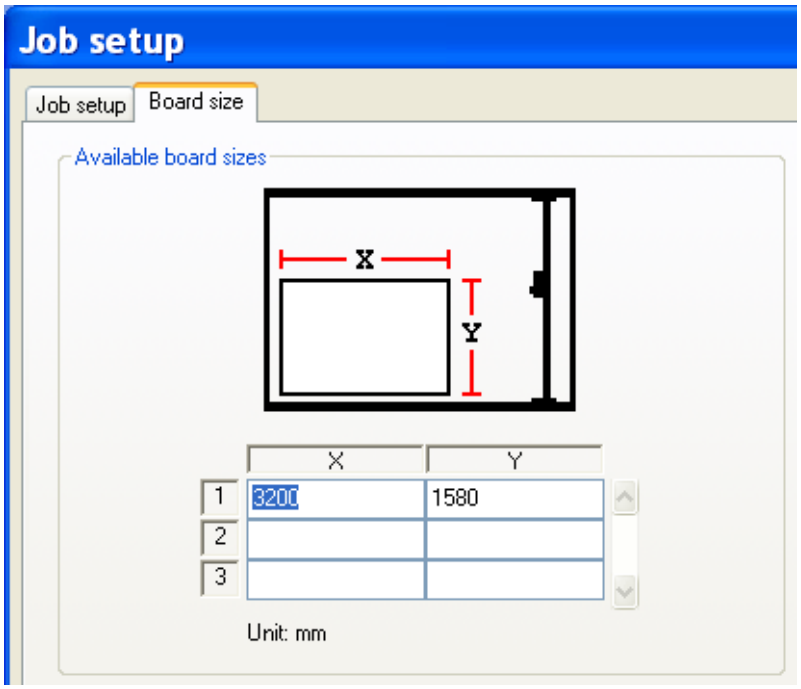
7.12.6 Add tools

The selection Add tools may be selected to add new tools or tools that fail to be automatically detected. The button Add the tool attaches the tool selected in the Tool dropdown list to the tool list.

7.13 Board size

The list of available board sizes is maintained from the Board size dialogue, available from:

- **Main Menu->Options->Board Size setup**
- The **Job View** toolbar button, select the **Board Size** tag
- Pop-up dialog in Job View
- **Ctrl + J**

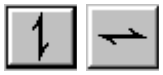


To edit already defined boards, edit the values directly in the table.
To add new boards, go to the last line in the table and add the new material to the empty line.
Press the **Apply** button to save the new values.

Select the right board size from the **Job View->Board Size** drop down list.
This will ensure a correct size of the displayed board in **Job View**.

7.14 Change Flute/grain direction

The flute / grain direction is altered from:



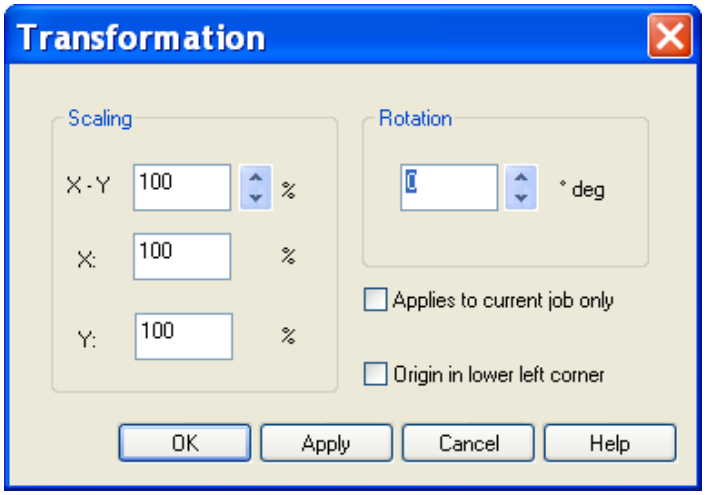
- **Main Menu->Options->Toggle Flute Direction**
- **Job View toolbar-> Toggle Flute Direction**
- Pop-up dialog in Job View
- **Ctrl + F**

Correct setting of flute / grain direction is important in order to obtain correct cutting/creasing depth.

7.15 Transformations

The transformation dialog is available from:

- **Main Menu**->**Options->Transformation**
- **Ctrl + Alt + T**
- Pop-up dialog in **Job view**



7.15.1 Scaling X/Y

Enter a % value in the edit box to scale the design.
A value less than 100 will decrease the size, and a value greater than 100 will increase the size of the design.
Use the Up/down arrows to step the scaling in steps of 10%.

7.15.2 Scaling X, Scaling Y

Enter a % value in the edit boxes to perform differential scale of the design.
Note:
Unfortunately, the picture in Job view does not show the design with differential scaling, only common scaling. But the result on the table is according to the input.

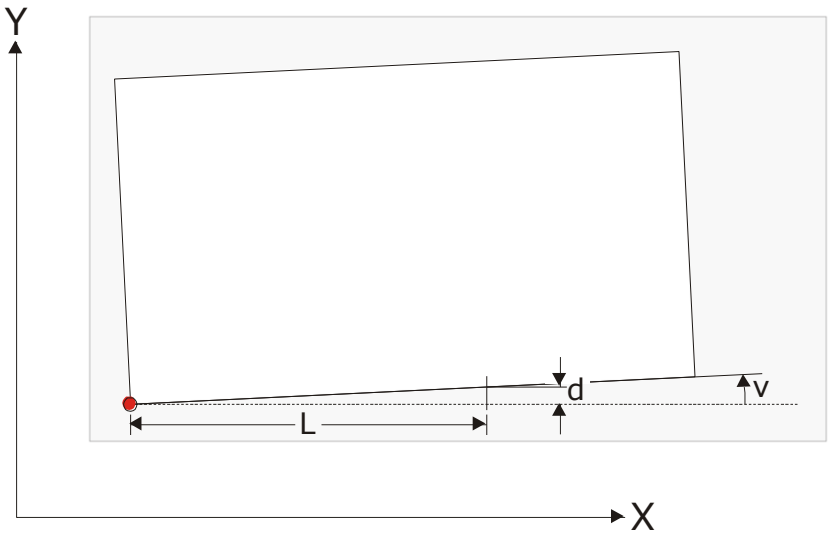
7.15.3 Rotation

Enter a degree value in the edit box to rotate the design.
Use the table on next page for simple angle calculation.
Use the Up/down arrows to step the rotation in steps of 90 degrees.
Example:
A value of 90 will rotate the design 90 degrees in counter clock wise direction.
You can enter both + and - values.

7.15.4 Current Job Only

Check this box to make these transformations valid for the current selected input file only.

7.15.5 Rotation angle calculation



Use the table below to calculate the angle from a simple measurement.

In a distance L from the lower left corner, measure the deviation from the horizontal line (d).

Find the corresponding d – value in the table below and read the angle v in degrees.

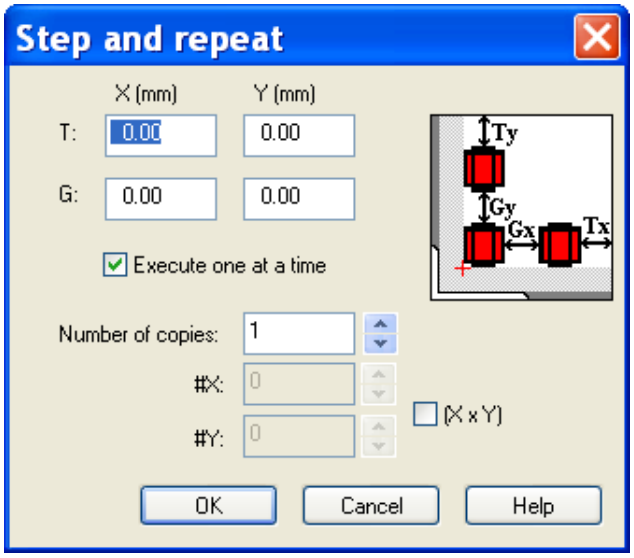
L = 1 m / 40 inches.

d (mm)	v (deg)		d (mm)	v (deg)		d (in.)	v (deg)		d (in.)	v (deg)
0,5	0,029		20	1,146		1/64	0,022		21/32	0,940
1	0,057		21	1,203		1/32	0,045		11/16	0,985
1,5	0,086		22	1,260		1/16	0,090		23/32	1,029
2	0,115		23	1,318		3/32	0,134		3/4	1,074
3	0,172		24	1,375		1/8	0,179		25/32	1,119
4	0,229		25	1,432		5/32	0,224		13/16	1,164
5	0,286		26	1,489		3/16	0,269		27/32	1,208
6	0,344		27	1,547		7/32	0,313		7/8	1,253
7	0,401		28	1,604		1/4	0,358		29/32	1,298
8	0,458		29	1,661		9/32	0,403		15/16	1,343
9	0,516		30	1,718		5/16	0,448		31/32	1,387
10	0,573		31	1,776		11/32	0,492		1	1,432
11	0,630		32	1,833		3/8	0,537		1 1/8	1,611
12	0,688		33	1,890		13/32	0,582		1 1/4	1,790
13	0,745		34	1,947		7/16	0,627		1 3/8	1,969
14	0,802		35	2,005		15/32	0,671		1 1/2	2,148
15	0,859		36	2,062		1/2	0,716		1 5/8	2,326
16	0,917		37	2,119		17/32	0,761		1 3/4	2,505
17	0,974		38	2,176		9/16	0,806		1 7/8	2,684
18	1,031		39	2,233		19/32	0,850		2	2,862
19	1,088		40	2,291		5/8	0,895			

7.16 Step and Repeat

The Step and Repeat dialog is available from:

- **Job View** tool bar button
- Pop-up dialog in **Job view**



Use this function to create multiple copies of a job.

T - **Trim** (distance from sheet edge).
G - Gap (distance between each item).

7.16.1 Execute one at a time

This function depends upon Sequencing being enabled.
When enabled, one and one design is completed.
If disabled, all crease lines in all designs are completed before the knife lines are carried out.

7.16.2 (XxY)

The Step and Repeat layout is available in two modes, determined by the **(XxY)** check box:

7.16.2.1 (XxY) disabled

Select a suitable **board size**, and specify the number of copies in the **Number of Copies** edit box. The number of copies will be distributed on the specified board with Y-axis priority, that is, one Y-column of jobs will be filled up before a new one is established.

7.16.2.2 (XxY) enabled

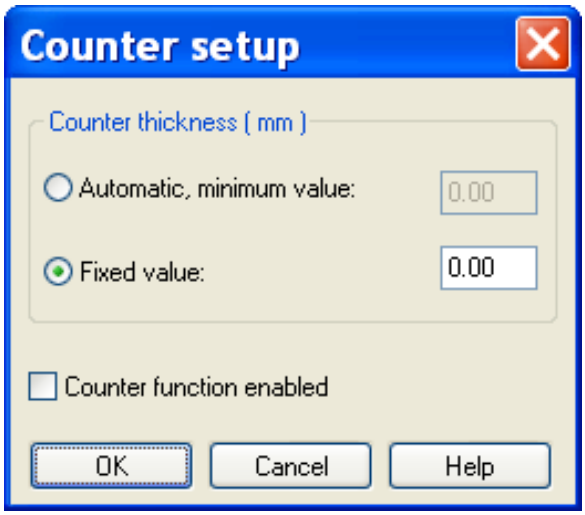
You specify the number of copies in the #X and #Y edit boxes. The total number of copies will be X x Y.
The job will be distributed in X columns and Y rows regardless the size of the board.
The **Execute one at a time** checkbox determines whether each copy should be completed before moving on to the next. Alternatively, all crease operations for all copies are completed before moving on to knife operations, and so on.

Note: If Sequencing is disabled, job execution will be as **Execute one at a time.**

7.17 Counter setup dialog

This function is available when **Application** is set to **Folding Carton** from:

- **File View toolbar->Matrix**
- **Options->Counter setup**



The Counter function is used when the job is executed on top of a matrix.
The purpose of this function is to avoid cutting through the matrix.

7.17.1 Counter thickness, Automatic, minimum value

Used when the thickness of the matrix and the material to be cut is equal. The thickness of the matrix and the material will be measured. The cutting depth is set to the half of the measured value. If the matrix thickness in this manner becomes less than the minimum value specified, the value specified will be used.
The minimum value should be within 0.1 - 8 mm (0.004 - 0.3 ").

7.17.2 Counter thickness, fixed value

The specified value is used as the matrix thickness. The fixed value should be within 0.1 - 8 mm (0.004 - 0.3 ")

7.17.3 Counter function enabled

Use this check box to enable/disable the counter function. The Matrix button in the **File View toolbar** will change face accordingly:

The **Counter** function is available, but disabled.

The **Counter** function is enabled.

7.18 Vacuum control

Note: Vacuum quick release and vacuum section selection will not work before the Vacuum push-button on the Operator panel has been operated once.

7.18.1 Vacuum control modes

Two control modes are available, selectable from the 'Option', 'Table setup' - dialog:

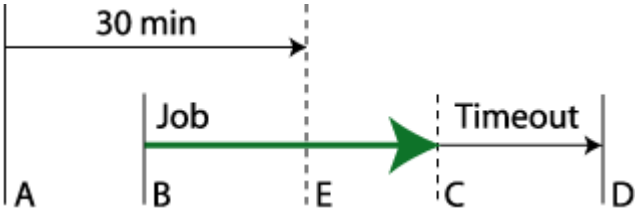
- Disable 'I Cut controlled' function to select XP vacuum control.
- Enable 'I Cut controlled' function to select i-Cut vacuum control.

7.18.2 XP vacuum on/off control

From Option->Table dialog, two modes of vacuum control is available:

- Manual (the **Manual control** function is enabled):
  Vacuum on / off is controlled from the Vacuum push-button on the Operator panel.

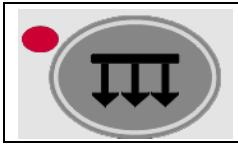
- Automatic (the **Manual control** function is disabled).
  The function is illustrated as follows:



A	Vacuum is switched on using the *Vacuum on* push-button.
B	A job is started. The vacuum pump will be started automatically.
C	The job is finished.
D	The vacuum pump is switched off a time 'Timeout' after the job is finished. The time is entered in the Vacuum control dialog shown above.
E	If no job is started within 30 min. after the vacuum is switched on, the vacuum pump is switched off automatically.

7.18.2.1 Vacuum quick release mode (option)

	Enable the vacuum quick release mode by pressing the *Vacuum release* push-button. The function is enabled when the button lamp is lit.

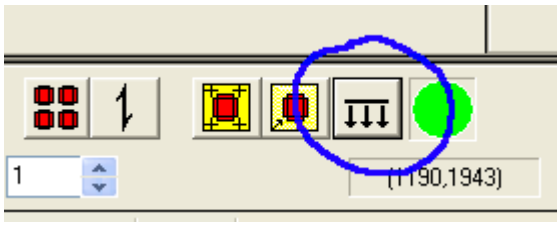
	If you are in the Vacuum quick release mode and the vacuum is switched off using the *Vacuum on* push-button, a valve will open to allow a quick release of vacuum inside the cutting table. When vacuum is switched on again, the valve will close.

7.18.3 i-Cut vacuum control

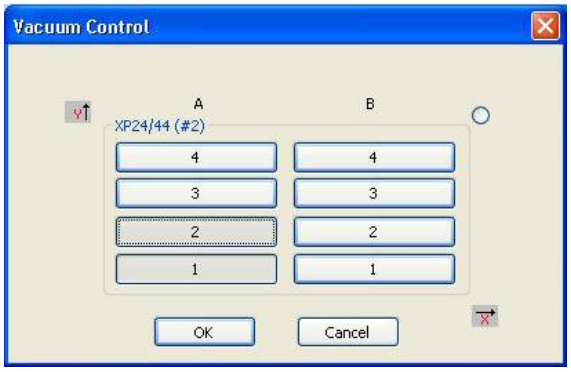
Pressing the *Vacuum on* pushbutton will start the vacuum pump. Pressing the button a second time will stop the pump.
Pressing the Vacuum release pushbutton on the Operator panel will open the vacuum valve to allow quick release of the vacuum inside the cutting table.

Pressing the button a second time will close the valve and provide vacuum on the table as long as the pump is running.
Note: When running i_Cut, the 'i-Cut vacuum control' should be enabled.

7.18.4 Vacuum section selection

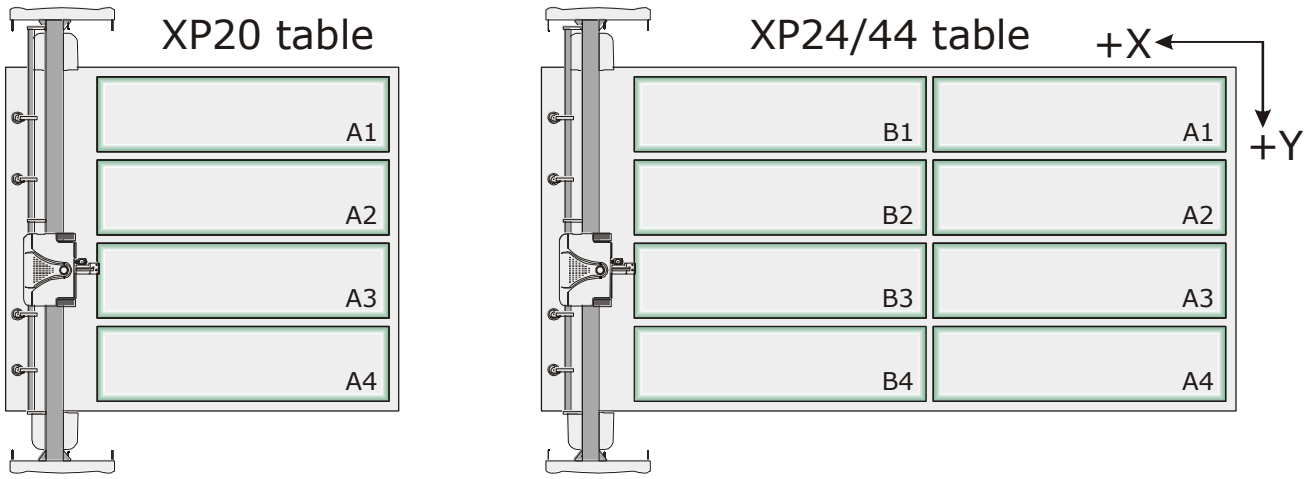


Press Vacuum Section Selection button to enter the Vacuum Section Selection dialog:



From this dialog, you prepare a suitable vacuum - area on the table by selecting vacuum sections.
The numbers correspond to the Cutting Table as shown in the picture below.

Press a button once to enable a section, push the button a second time to disable.

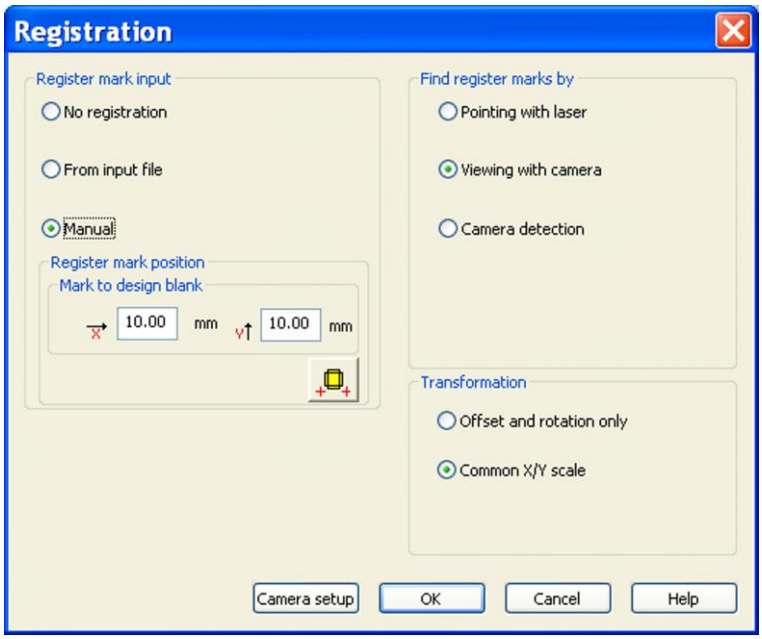


For XP20A, four vacuum zones are available, for XP24/44, eight zones are available.

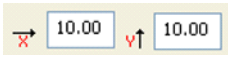
7.19 Registration setup

Note:
More information about ARS is available:

- In this manual, chapter **Work with ARS** (58).
- In the Service guide for ARS, available from the XP-Guide installation CD.



7.19.1 Register marks input

No registration	No registration function is active when selected	
From input file	Registration mark coordinates are read from the input file	
Manual	Register mark coordinates are entered via the fields in the Mark to design blank fields. Only two marks are used when using manual input.	
		Define the vector from the lower left mark to the design blank. The second mark is placed in symmetric distance to the design.
		Defines where the marks are placed relative to a design (Register mark position).

7.19.2 Find register marks by

Pointing with laser	Use the laser pointer to locate the register marks. Place the laser pointer in the center of the register mark and press start.	
Viewing with camera	Use the camera to locate the register marks. Place the register mark in the center of the picture and press start, or place the register mark in the picture and click on the register mark.	
Camera detection	Detect the register mark automatically. The system needs to be equipped with a proper license to do this.	
	Search	If no register mark is detected, the system will try to search for a register mark around the expected location.
	Register mark	The system can automatically detect a **Cross** or a **Circle**

7.19.3 Transformation

Offset and rotation only	The design is offset and rotated. No scaling is applied. To calculate rotation minimum two marks are required.
Common X/Y scale (Uniform)	In addition to offset and rotation, the system will calculate a scale factor. Both axes are scaled with the same factor.
Different X/Y scale (non-uniform)	Offset, rotation and scale is calculated, allowing different scale factors for the main design axes. Minimum three registration marks are required.

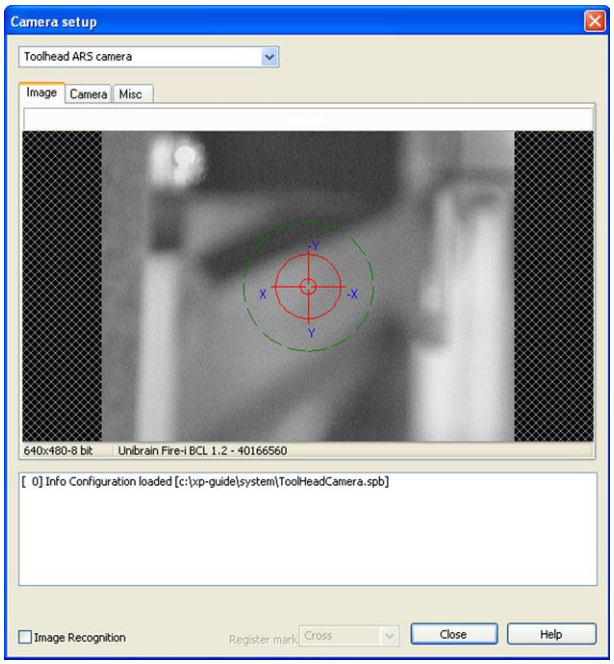
7.19.4 Register on

All sheets	Register marks are read and new transformation is calculated for each repeating copy of a job.
First sheet only	Register marks are read on the first copy of job only and this transformation is used on all repeated jobs after that. First copy is the first time a job is run after the file has been opened.

7.19.5 Camera setup

Enter the **Camera setup** dialog (134).

7.20 Camera Setup



7.20.1 Camera control

Three different camera control views are available from the tabs on top of window:

Image	This is the default view where the camera picture is shown. In the picture there is a red marker to indicate the centre of the picture. The green circle indicates that high accuracy area. If a register mark is detected outside this area the machine moves the camera centre over the register mark and takes a second picture. Image recognition: Use this function to test if a register mark is detected. The function is for this dialog only.
Camera	This tab defines which camera to be used and also which camera that creates the Image. The only time the operator needs to use this tab is when a new camera is installed (1).
Misc	This tab is used when entering the license code (1).

(1) For more information, see Service Guide for ARS available on the XL-Guide CD.

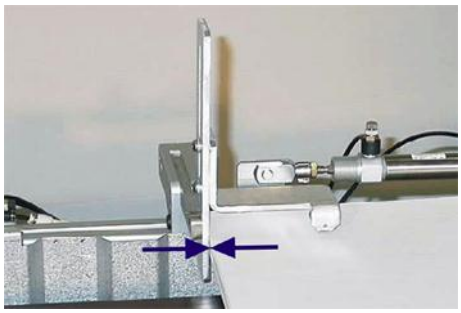
7.20.2 Other camera controls

Camera info	Informational messages from the camera control.
Live Video	Press this button to enable live video. The camera picture will be continuously updated.
Snapshot	One single picture will be taken. If a register mark is available in the picture, it will be detected.
Adjust offset	Run wizard in order to adjust the offset of the camera.
Calibrate Camera	Run wizard to calibrate the camera.

7.21 In-stack setup

7.21.1 Stackers, X and Y

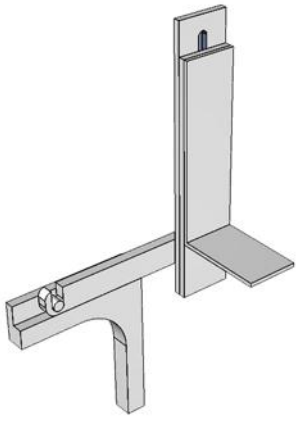
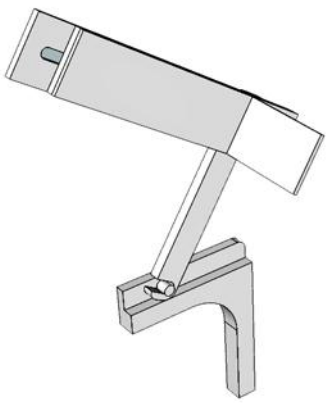
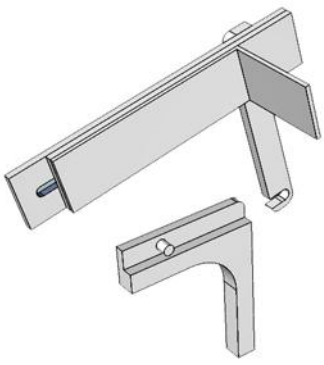
Stackers in X and Y keeps the material aligned.

		
Stacker close to the sheet edge	X-axis stacker lock	Y-axis stacker lock

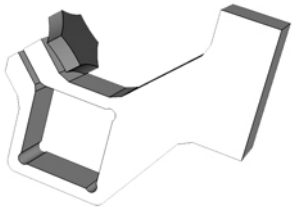
The Stacker position is manually adjusted.
The procedure is as follows:

1		From **Job view->Production control,** enable **Stacker in**
2		Release the stacker lock
3		Move the Stacker by hand until it is close to the edge of the material
4		Lock the stacker lock again.
5		Disable **Stacker in**

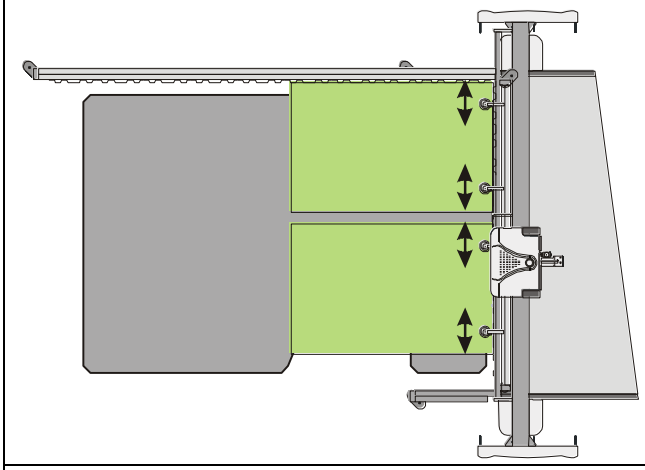
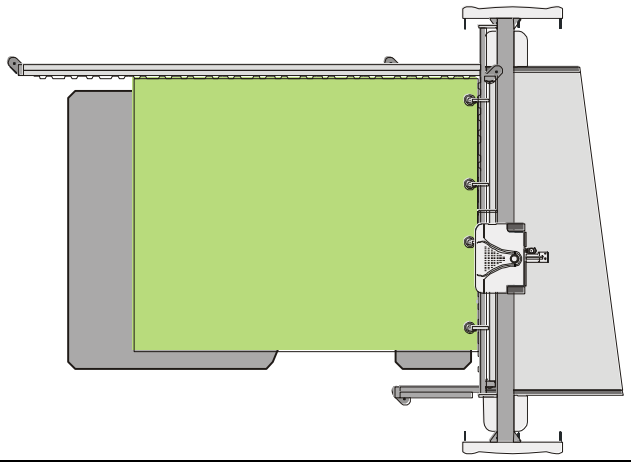
7.21.2 Remove stacker

		
1 – Lift up	2 - Rotate	3 – Pull out

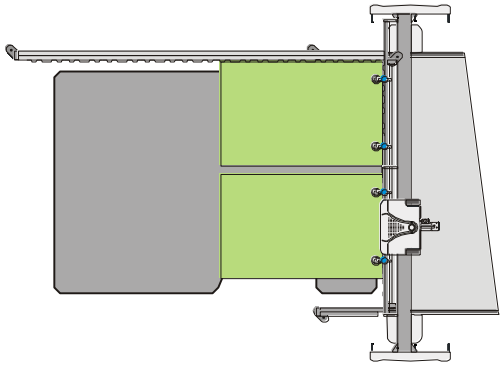
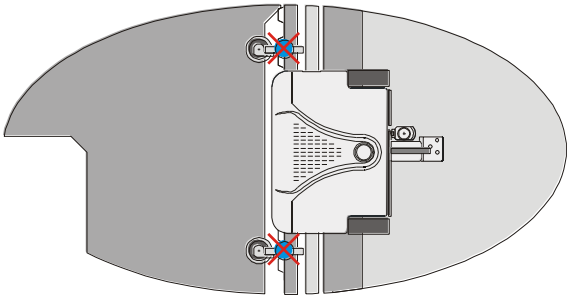
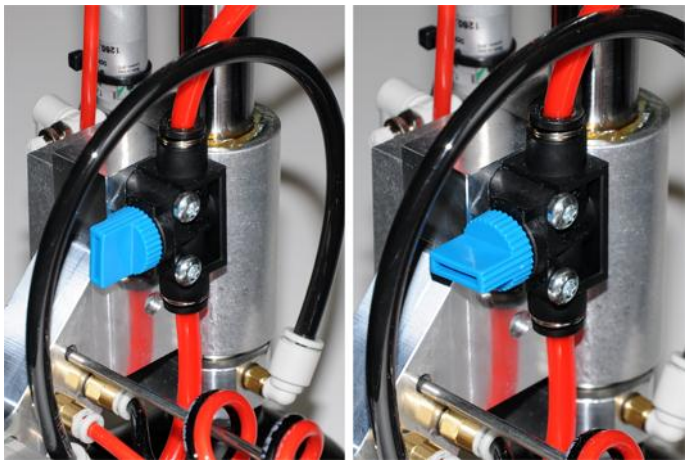
7.21.3 Load cup position



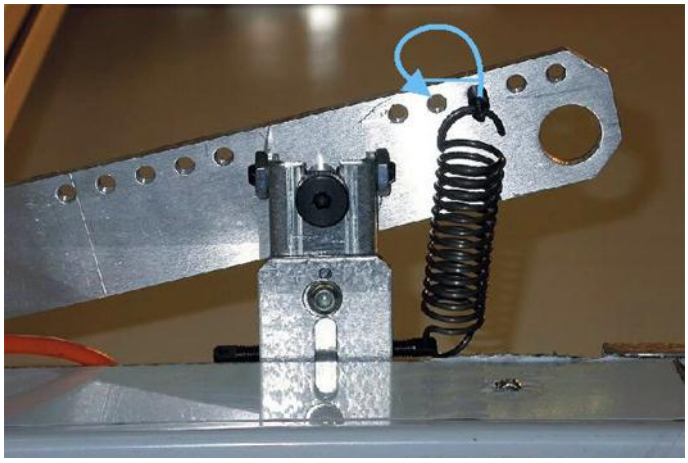
To adapt to different sheet sizes, the suction cups are moveable.
Release the knob to move a cup.
When in correct position, lock the knob.

	
Ensure that at least 2 suction cups are located inside each sheet of material, with a good distance in between.	If all 4 suction cups are used, ensure they are evenly distributed across the sheet.

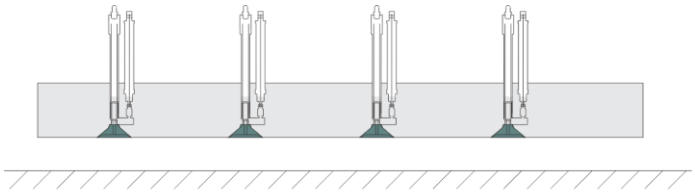
7.21.4 Load cup on/off

	
	Suction cups outside sheet(s) should be closed. Use the Load cup on / off switch available on each suction cup to open (picture at left) or close (picture at right).

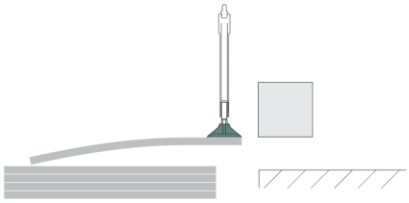
7.21.5 In-stack pressure roll

	The purpose of the pressure roll is to keep the In-stack material down.
	The downward pressure is adjustable in this way: Remove spring from nut. Move the nut to wanted position. Mount the spring again.

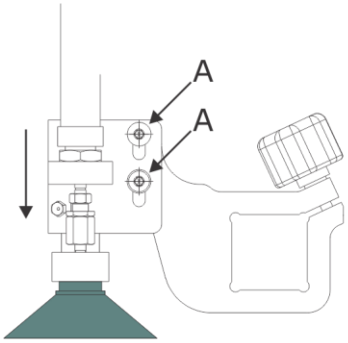
7.21.1 Load cup height adjustment



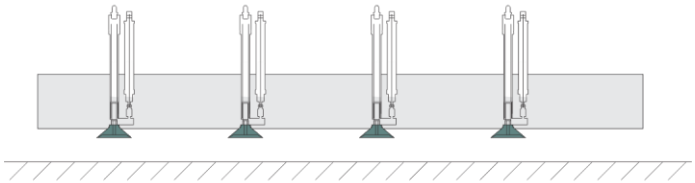
From factory, the load cups are aligned with the bottom of the traverse beam.



For heavy materials, this height level could lead to unwanted material bending.



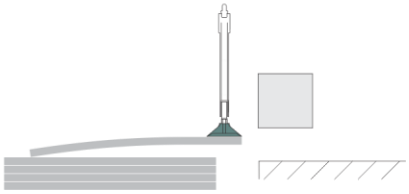
It is possible to lower the load cups. Loosen the screws A and push the unit down.
Fix again.



It is important that all load cups are adjusted to exact the same height.

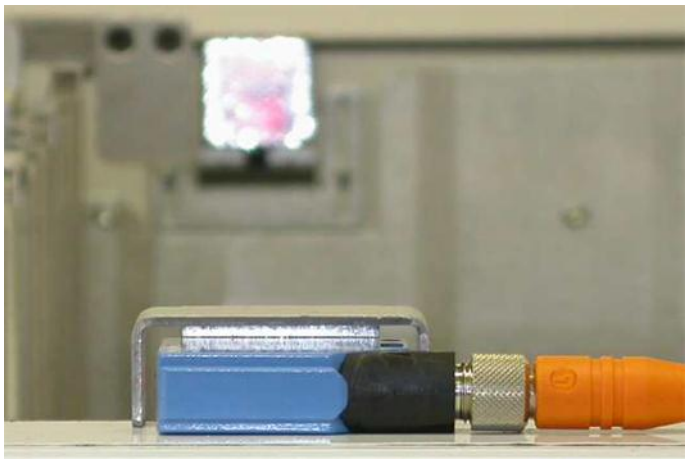
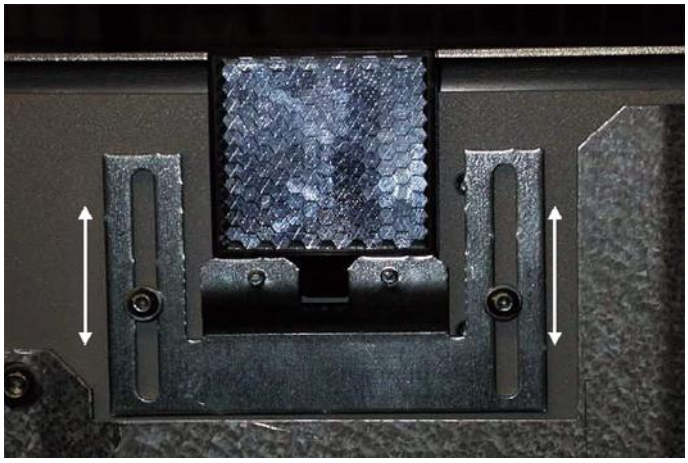
Warning:
Special attention should be made when the suction cups are below traverse level:

- Collision risk as the space between the traverse beam and the table is reduced.
- Inaccuracy if the load cups are misaligned.



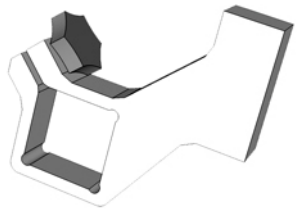
Result is:
Less bend, better load operation.

7.21.2 In-stack top level height

	A Photo-cell system is used to keep a constant In-stack top level.
	The top level is adjustable in this way: • Loosen the screws. • Move the reflector up/down. • Fix the screws

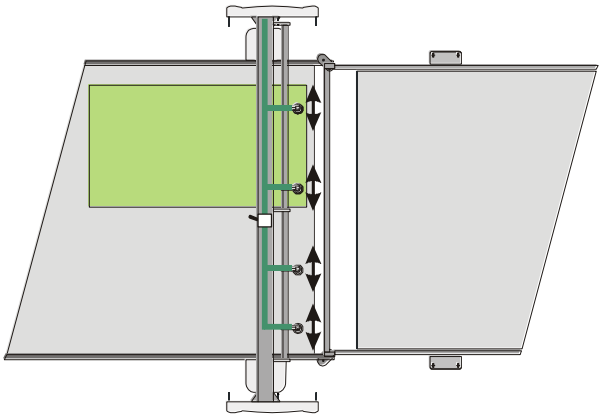
7.22 Out-stack setup

7.22.1 Unload cup position



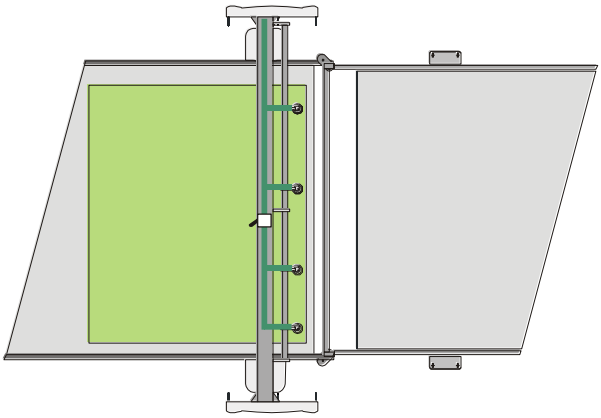
To adapt to different sheet sizes, the suction cups are moveable.
Release the knob to move a cup.
When in correct position, lock the knob.

7.22.2 Unload cup selection switch

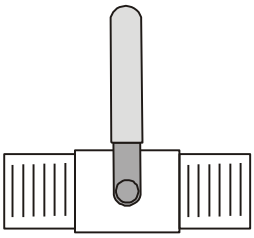


At least two suction cups must be used in order to pick up the sheet of material.

If the other suction cups are outside the sheet, and thus not in use, they must be turned off.

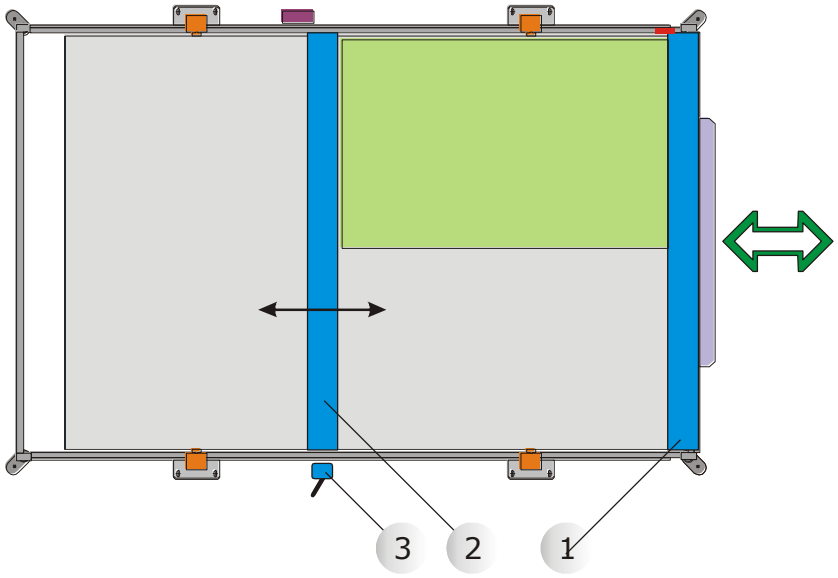


Distribute the suction cups evenly across the sheet.



Locked position

7.22.3 Fixed Out-stack beam

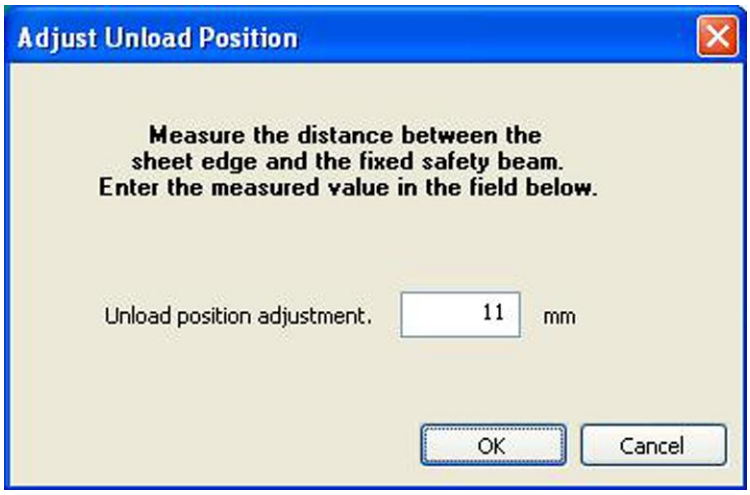


When stored in the Out-stack, the front edge of the material is aligned towards the fixed Out-stack beam (1).

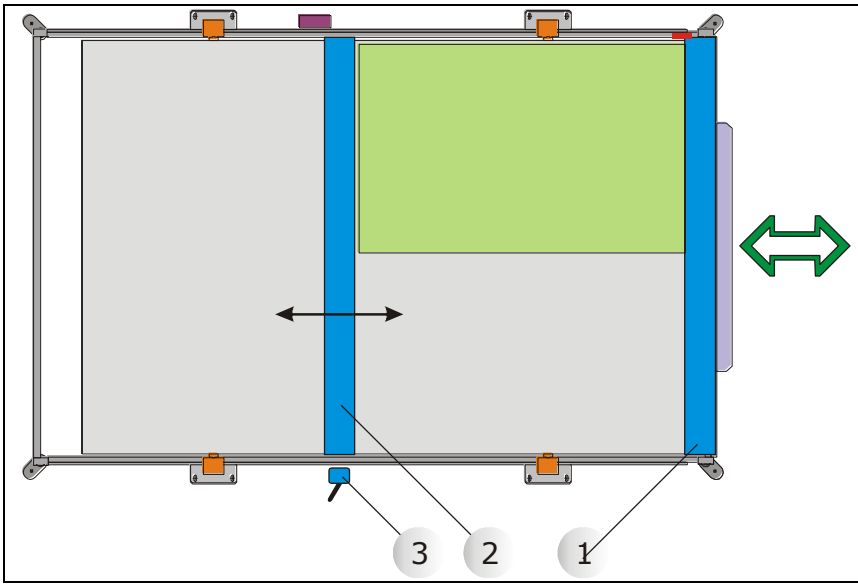
In order to fine tune the stack position, complete the Adjust Unload position wizard.

The wizard is started from:

Options->Table options-> Adjust Unload position.


Adjust Unload Position
Measure the distance between the sheet edge and the fixed safety beam. Enter the measured value in the field below.
Unload position adjustment.
11
mm
OK
Cancel

7.22.4 Movable Out-stack beam



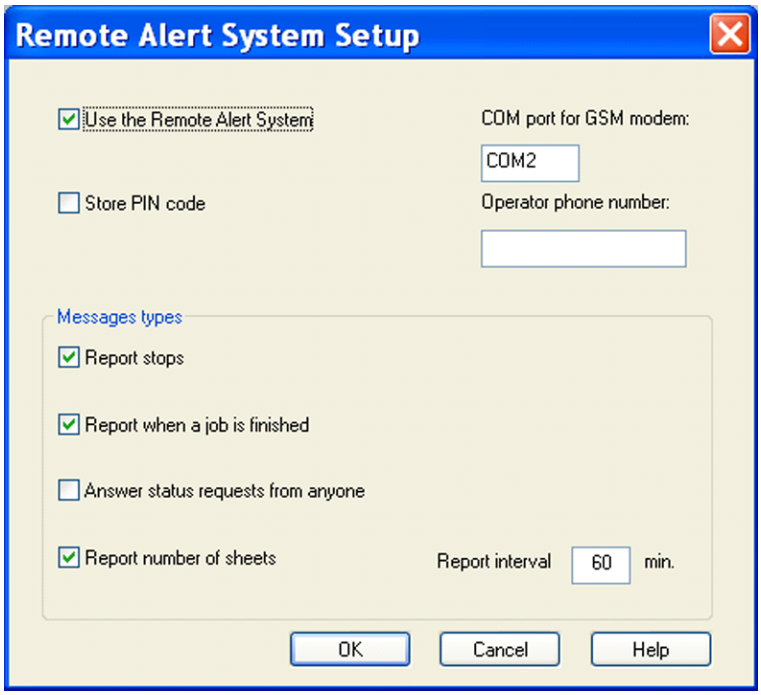
When stored in the Out-stack, the front edge of the material is aligned towards the fixed Out-stack beam (1).

To secure that the sheets are perfectly aligned, position the movable Out-stack beam (2) just behind the rear edge of the material; leave a gap of 2-3 mm / 0.1 inch.

Fix it using the locker (3).

7.23 Remote Alert system (GSM communication)

7.23.1 Remote Alert setup



Remote Alert setup is available from **Options-> Remote Alert System Setup**.

Note:
It is a pre-requisite for enabling this function that:

1. The Remote Alert hardware is installed on the PC.
2. A SIM module is installed in the GSM module.

Use Remote Alert System	Specify if the Remote Alert System shall be used.
Store PIN code	Specifies if the PIN code shall be remembered or not. If this option is disabled, you will be prompted for the PIN code whenever the GSM modem has been off.
COM port for GSM Modem	Specify the PC port that is connected to the GSM modem.
Operator phone number	Specifies the number that the alert messages are sent to.
Message types	Specifies the message types that shall be used: **Report stops** A message will be sent whenever the DCM stops during a job. **Report when a job is finished** A message will be sent when a job is finished. **Report number of sheets** The number of produced sheets will be reported every Report interval. **Report interval** If **Report number of sheets** is enabled, specify the interval between each report.
Answer status requests from anyone	If enabled, any status request will be answered. If disabled, only status requests from the **Operator phone number** will be answered.

7.23.2 Status request to the Remote Alert system (RAS)

You can ask for a status report from the Remote Alert system:

1. Send an SMS with the text “STATUS” to the RAS phone number.
2. The answer will contain:
    1. Number of sheets requested.
    2. Number of sheets processed.

You can select if anyone or just the Operator phone number is allowed to call for a status request, see **Answer status requests from anyone** (144).

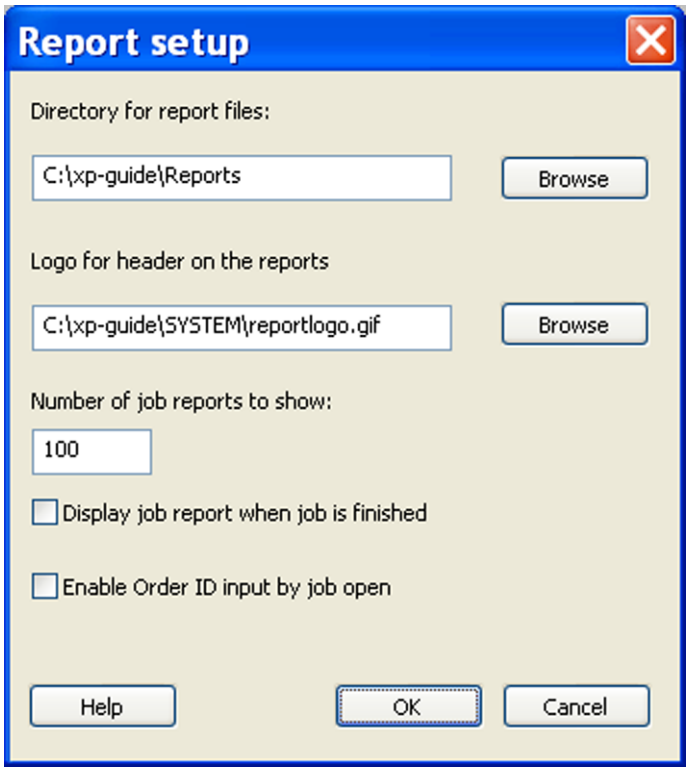
7.24 Reporting

7.24.1 Introduction

If Job reporting is enabled (227), an xml job report file is prepared each time a job is completed.
If you start a job using the input file FileName01.acm, a job file FileName01.xml will be created.
If you start a new job, using the same input file name, a new report file, FileName01_1.xml, will be created.
If you start a new job using the input file FileName02.acm, a job file FileName02.xml will be created.

Three pre-defined reports are available from Main menu->View; System report and Jobs executed/Job reports.

7.24.2 Report setup



Report setup is available from **Options->** Report setup

Directory for report files	Type the name of, or browse for the directory to store report files (.xml - files). Click one file in the directory to select it.
Logo for header on the reports.	Type the name of, or browse for a customized logo file in GIF format. This logo will appear on top on every report file generated. Leave this field empty if you don't want any logo on the reports.
Number of job reports to show.	Type in the maximum number of job reports to show in the Job report.

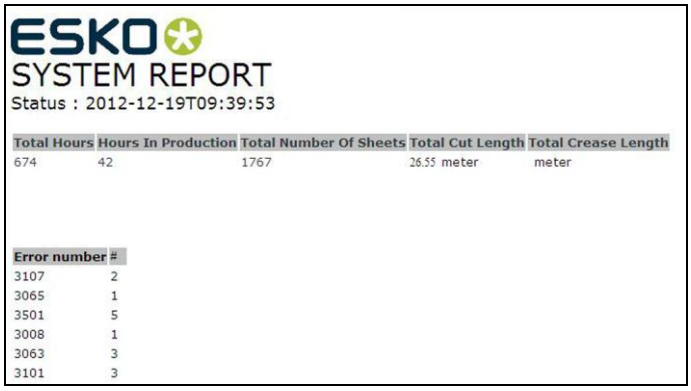
Display job report when job is finished	Enable if you want the job report to be displayed when it is finished.
Enable Order ID input by job open	Enable if you want the Order ID dialog (147) to appear when a job is opened.

7.24.3 Order ID

Enter a string to identify this job. The string will appear on the job report.

7.24.4 System Report

Available from Main menu->View-> System report.

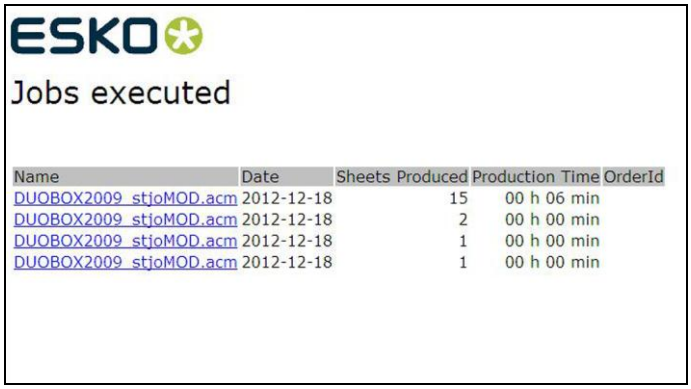

SYSTEM REPORT
Status : 2012-12-19T09:39:53

Total Hours	Hours In Production	Total Number Of Sheets	Total Cut Length	Total Crease Length
674	42	1767	26.55 meter	meter

Error number	#
3107	2
3065	1
3501	5
3008	1
3063	3
3101	3

7.24.5 Jobs executed

Available from Main menu->View->Jobs executed.


Jobs executed

Name	Date	Sheets Produced	Production Time	OrderId
DUOBOX2009_stjoMOD.acm	2012-12-18	15	00 h 06 min	
DUOBOX2009_stjoMOD.acm	2012-12-18	2	00 h 00 min	
DUOBOX2009_stjoMOD.acm	2012-12-18	1	00 h 00 min	
DUOBOX2009_stjoMOD.acm	2012-12-18	1	00 h 00 min	

7.24.6 Job report

Available from Jobs Executed report. Double-click on the job name.

Jobname :DUOBOX2009_stjoMOD.acm

Customer :
Address :

Sheets produced	Sheets ordered	Cut length	Crease length	Produtiontime
15	15	26.55 meter	meter	00 h 06 min

Job setup :heha_notool.mat
Material :
Designer :

Start time 2012-12-18T13:14:05
End time 2012-12-18T13:30:25

Intermediate stops:

Time	Reason
2012-12-18T13:25:38	Out-stack is not operative. Check photo cells in the out-stack.

Sheet to cut adjustment

X-Offset	Y-Offset	Rotation
0 mm	0 mm	0

7.24.7 Create your own reports

Based upon the xml report file FileName01.xml, it is possible to create your own reports.
Schema file is available as c:\xp-guide\system\Jobreport.xsd.

8. Tooling system, introduction

Laser radiation. Do not stare into beam!
The tool head is equipped with a class II laser pointer.
Emitted laser power < 1 mW.

Knife blades are extremely sharp. Therefore, take care when handling knife tools.

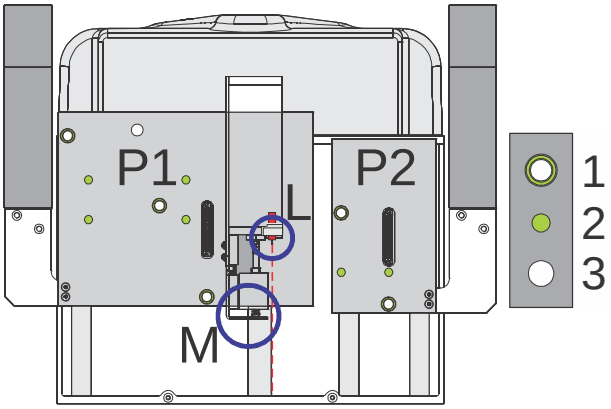
8.1 Tool handling and care

All tools are precision instruments and should be treated as such to ensure proper operation.
Take special care when:

- Tools are inserted or removed from their stations. No excessive force should be applied.
- Tools should not come in contact with hard surfaces while removed from their stations either temporarily or for storage.
- The tools and their stations should be kept clean with a soft brush.

8.2 Tool configuration

Kongsberg XP offers two different tool positions, P1 and P2, where different interchangeable tools can be mounted.
In addition, there are separate fixtures for laser pointer, measuring foot, camera, drill and pen tools:



L - Laser pointer

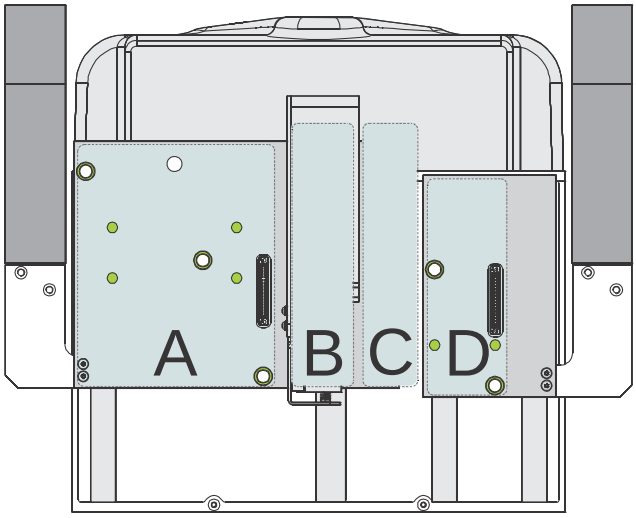
M - Measuring foot

Symbols used:

1 - Tool alignment

2 - Tool fixture

3 - Tool fixture

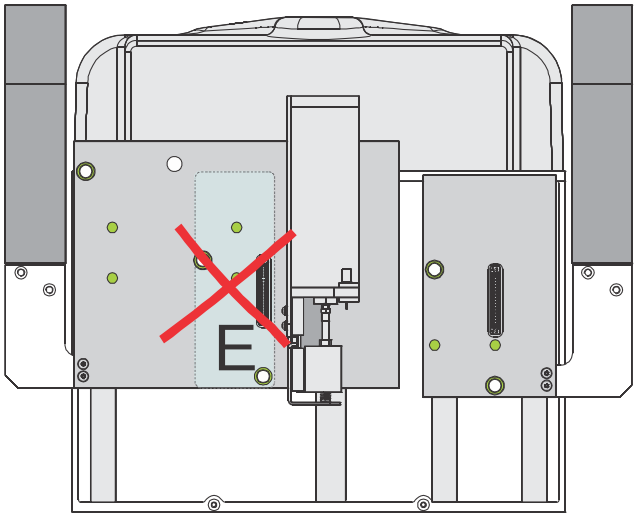


A – P1 tool position, see table below

B – camera position

C - drill / pen / ink tool holder position

D - P2 tool position, see table below



There is a space reserved for future tools in the E - position.

Technically, it is possible to put P2 - tools here, but none of the tools available now will work in this position.

The following tool configuration is available:

Tool type	Available tool inserts	P1	P2
HDU - Heavy-Duty Unit	HD Crease V-notch knife HD knife tool	Yes	
Foam Cutting Unit		Yes	
HD knife tool		Yes	
HSMU – High Speed Milling Unit		Yes	
HPMU – High Power Milling Unit		Yes	
VibraCut knife tool			Yes
HF VibraCut knife tool			Yes
Hi-Force knife tool			Yes
RM knife tool			Yes
RotaCut knife tool			Yes
PressCut tool			Yes
Drill / pen holder	Drill tool Ball point pen Ink tool (Fiber tip tool)		

8.3 How to replace a tool

When mounting a tool head onto the Z1 or Z2 tool positions, ensure that the alignment pins and the electrical connector on the tool head fits those on the bracket.

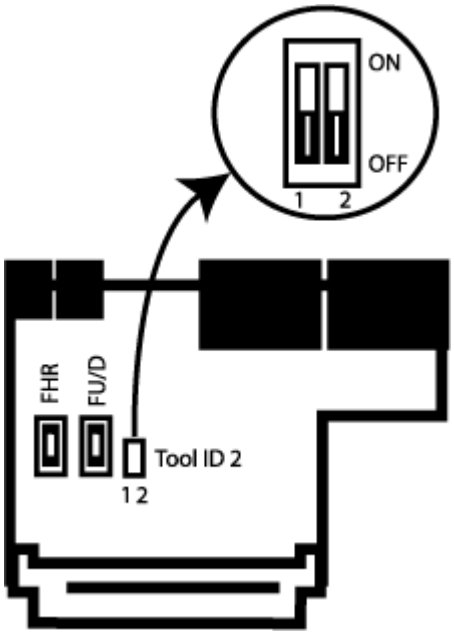
Use an Allen key, 6 mm, to fix the tool head.

Ensure both screws are properly fixed.

8.4 Two or more tools of the same type

Each tool is identified to the system by type. In addition, it is possible to identify up to four different tools of the same type.
One example: If you have two different Static knife tools, you can specify one to be number 1 and one to be number 2. In this way, all adjustment parameters will be stored and recalled automatically as the tool is mounted onto the machine.

How to define individual tool numbers



Inside each tool, there is a Tool Board.

By means of dip-switches, you can specify
4 unique tool numbers as illustrated at left.

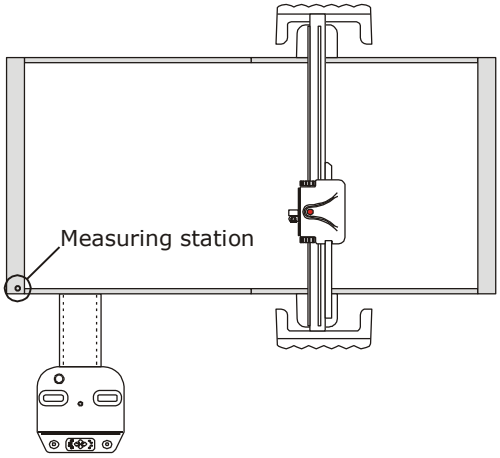
The different tool numbers are defined as follows:

	Tool board switch setting
Tool 1	1 & 2 off
Tool 2	1 on & 2 off
Tool 3	1 off & 2 on
Tool 4	1 & 2 on

Note: Depending upon the tool type, 2 or 4 individual tools can be specified.

8.5 Measuring station

XP is equipped with a Measuring station:



The Measuring station eliminates the manual adjustment of tool height.

The Measuring station covers the following functions:

- Calibrates the Measuring foot.
- Automatically measures the height of the tool tip.

If you, for any reason, would like to add an adjustment value to the measured value, a height adjustment dialog is available from the **Tool Configuration** menu.

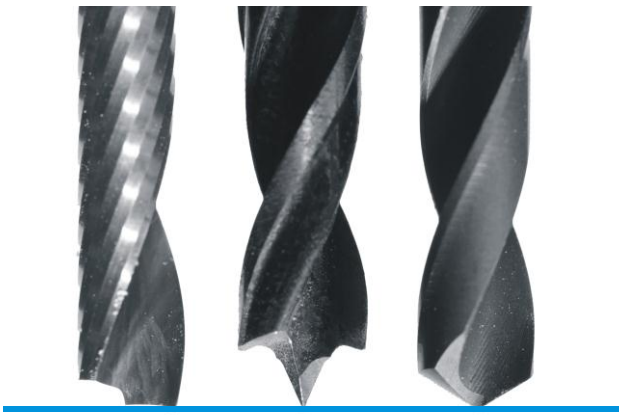
The measuring sequence is carried out as follows:

- When running the Table zero sequence.
- After any tool change.
- After the system has been inactive for 10 sec. or more.

8.5.1 XPA tool tip supervision

Before each sheet of material is processed, the knife tool is checked for correct knife height. If the knife height has changed, that is; the knife blade is broken, the execution will stop and an error message is displayed.

8.5.2 Tool depth and measuring station



Be aware how the Measuring station is working; it is the tool tip that is measured. Depending upon the actual tool, it might be necessary to add depth in order to achieve cut or drill hole through the material.

Additional depth is entered in two ways:

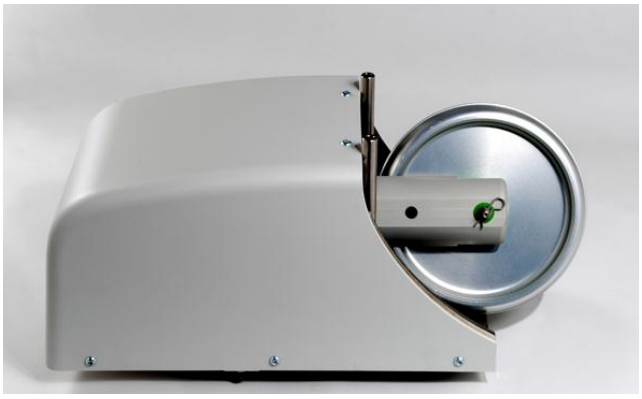
1. The general depth of a tool is entered in the **Tool height wizard** available from the Tool Configuration menu (116).
2. The depth for a certain material or job is entered in the **Job setup** dialog (100).

8.6 HDU - Heavy-Duty Unit

Knife blades are extremely sharp!

8.6.1 Description

HDU with V-notch

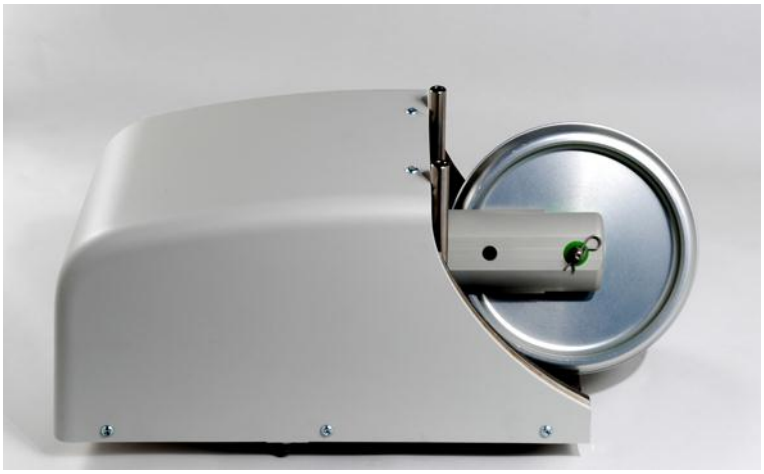


HDU with ø150 mm crease wheel

The Heavy-Duty Unit is a single position tool head specially prepared for V-notch and HD knife tools. In addition, the tool head can be equipped with a ø150 mm crease wheel.
For detailed description, see separate chapters for V-notch (157), HD knife tools (161) and ø150 mm crease wheels (155).

8.7 ø150mm Crease Wheel

8.7.1 Description



A ø150mm Crease wheel mounted on an Heavy-Duty Unit.

This crease wheel has the equivalent of 50kg [110lb.] of down-pressure. The additional pressure, combined with the large frontal area of the big wheel enables excellent crease quality in heavy-duty corrugated board and even permits creasing board with high recycle content without breaking the liner.
A broad range of wheels with different shapes is available.

8.7.2 How to mount / dismount the crease wheel

Insert / remove the cotter pin.

Insert / remove the latch pin.

8.7.3 Tool adjustment

For this tool, complete the following adjustments:

Lag setting	The lag value depends upon the blade adapter. Nominal value is 0 mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

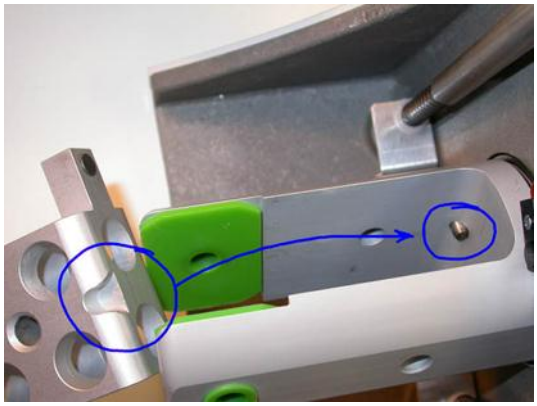
8.8 V-Notch Knife tool

Knife blades are extremely sharp!

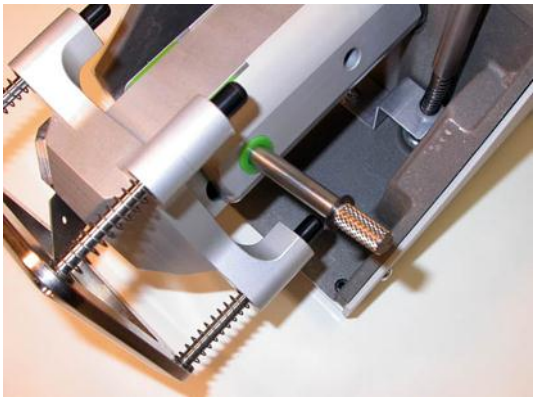
8.8.1 Description

The V-notch knife tool mounted on a Heavy-Duty Unit.

8.8.2 How to insert / remove the V-notch knife tool



1 Turn the V-notch knife tool correctly to fit the alignment pin.

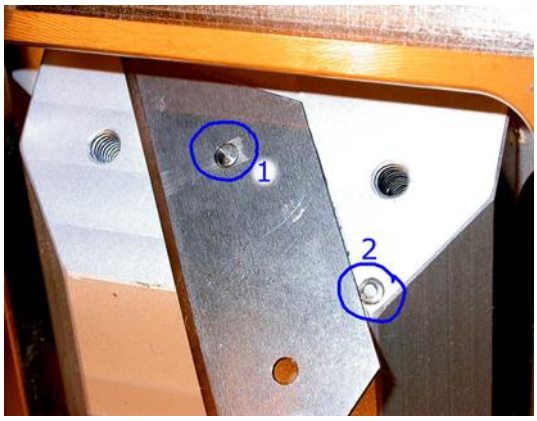


2 Insert the first latch pin.

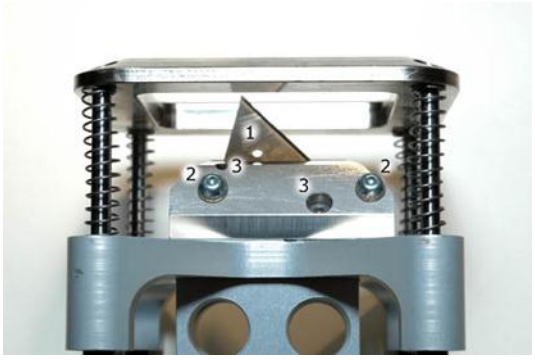
3 Insert the cotter pin.

4 Insert the second latch pin and cotter pin.

8.8.3 How to replace a knife blade



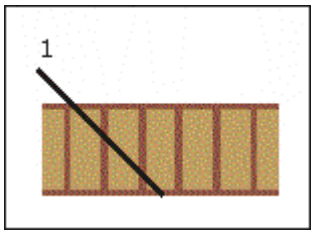
This picture shows how the knife blade is aligned using two guide pins beneath the blade clamping.



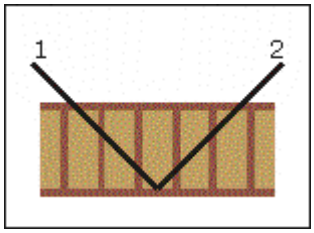
1. Loosen the two screws (2) of the knife blade clamping.
2. Carefully remove the blade (1).
3. Insert a new knife and make sure that it is aligned with the alignment pins (3) in the tool head.
4. Mount the new tool. (Note the position of the guide pin).
5. Select **Option, Tool Configuration** (CTRL+T), **Adjust active tool, Tool height calibration** wizard, to assure correct height of the new knife.

8.8.4 V-notch knife, modes of operation

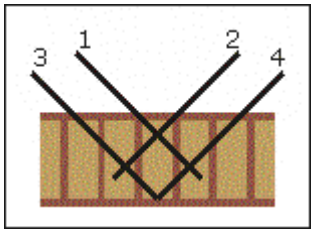
Note: V-notch knife adapters for different angles are available. The programming and operation will be similar to the 45 degree version shown here.



Single Cut
Set from Job setup, Extended.



Double Cut (1)
This is the default mode if neither Single Cut nor 4-Cut are enabled.



4-Cut (1)
Set from Job setup, More V-notch.

(1) – it is a pre-requisite for this function to work that the **Sequencing** function is enabled, set from System Option dialog (96).

8.8.5 About tool adjustment

- For the V-notch knife, we recommend the manual procedures for tool rotation and centre offset adjustment.
- When adjusting tool rotation and centre offset, use a thin folded carton material.
- Remember that you should look at the bottom side of the material for correct alignment.
- The adjustment depends upon the actual material due to weight, structure and thickness. For optimal result, a fine tuning of the adjustments in the actual material should be carried out.

For this tool, complete the following adjustments:

Lag setting	The knife lag depends upon the blade adapter. Nominal value is 0-7 mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.8.6 How to set the depth of the V-notch knife

1. The default depth of the V-notch knife is cut through the entire material.
2. Define the depth of the V-notch cut in the **Option, Job Setup** (CTRL+J)
3. Normally the cut should extend down to just above the bottom liner closest.

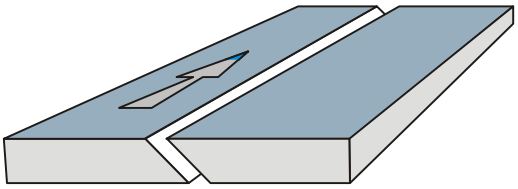
8.8.7 How to set the width of the V-notch cut

Enter **Job Setup, More V-Notch** to make adjustment to the default width.

8.8.8 How to run the 4-cut function

Enter **Job Setup, More V-Notch** to make adjustment to the default width.

8.8.9 V-notch cut direction



The blade angle and the cut direction must be taken into account when cut jobs are prepared.

The arrow indicates the cut direction.

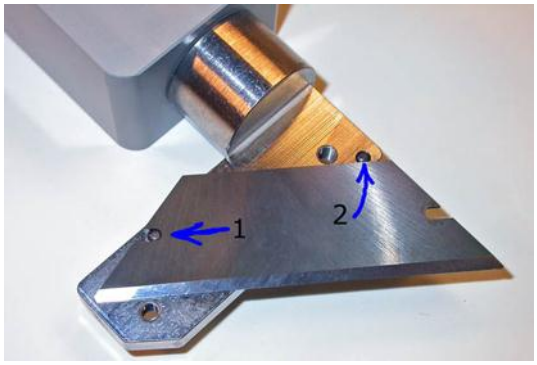
8.9 HD Knife Tool

Knife blades are extremely sharp!

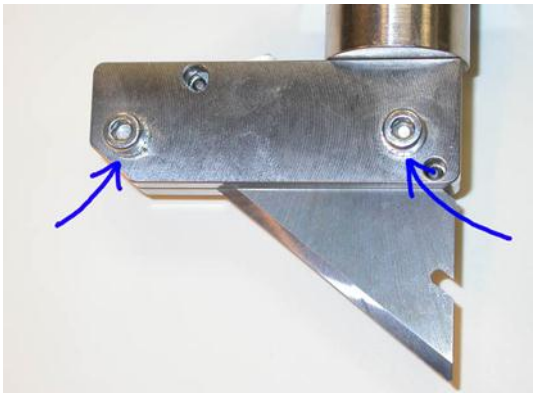
8.9.1 Description

The HD knife tool mounted on a HDU.
The HD knife tool is used for rigid board such as ReBoard and triple wall material. The tool is limited to straight lines longer than 50mm (2”).
The tool is prepared for special, trapezoid shaped knife blades.

8.9.2 How to replace a knife blade

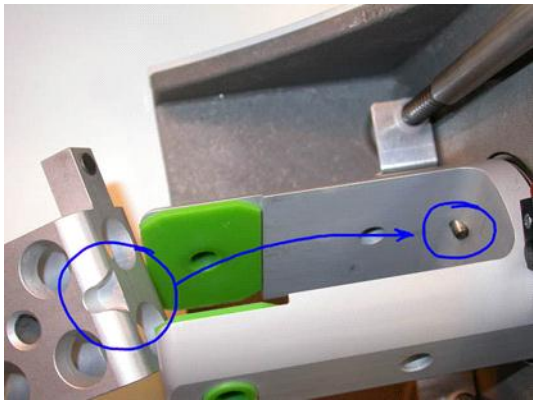


This picture shows how the knife blade is aligned against two alignment pins.

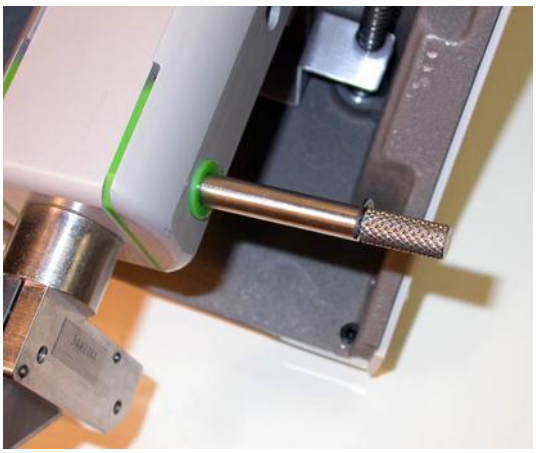


Use these two screws to fix / release the knife blade.

8.9.3 How to insert / remove the HD knife tool

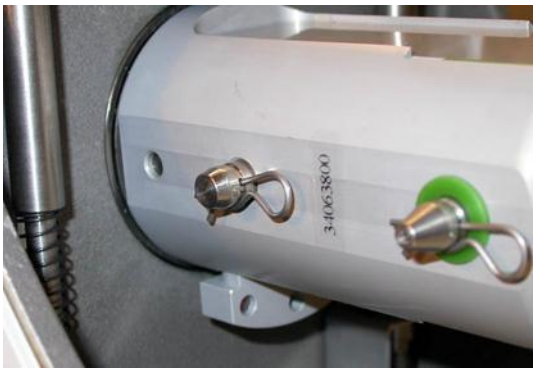


1 Turn the HD knife tool correctly to fit the alignment pin.



2 Insert the first latch pin.

3 Insert the cotter pin.



4 Insert the second latch pin and cotter pin.

For this tool, complete the following adjustments:

Lag setting	The knife lag depends upon the blade adapter. Nominal value is 10 mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.10 Foam Knife Tool

Knife blades are extremely sharp!

Please note: Be careful where to place the tool head when not in use.

If the tool head is left down on a table surface, the knife might be exposed, as the material hold down wheels moves up.

8.10.1 Tool head mounting

The Foam knife tool head is mounted onto the Z1 – carriage in the same way as the other Z1 tool heads.

For this tool, complete the following adjustments:

Lag setting	The knife lag depends upon the blade adapter. Nominal value is 3 (5) mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

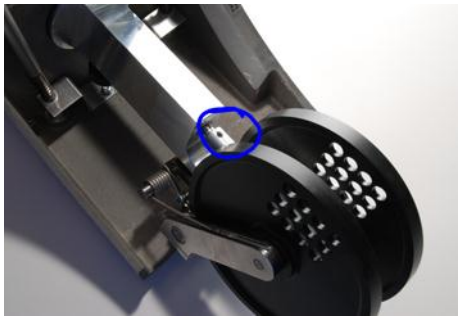
For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.10.2 How to replace a knife blade

Loosen the fixing screw, replace the knife blade and fix it again.

No additional adjustments are necessary, as the tool height is measured automatically.

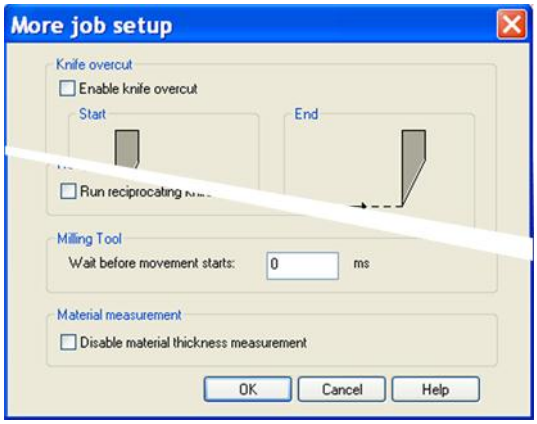
8.10.3 How to replace the knife adapter



Loosen the fixing screw, replace the adapter and fix it again.

No additional adjustments are necessary, as the tool height is measured automatically.

8.10.4 Disable material thickness measurement



Set from **Job setup -> More**

For the Foam Knife tool, the **Disable material thickness measurement** function is available. Use this function if

- Your foam material is too soft for the measuring system.
- The surface of your material is un-even.

When the **Disable material thickness measurement** function is enabled, the following rules applies:

- In Job setup, the **T** – function must be used for depth settings.
- In Job setup, the **Depths unit** must be set to mm/inches (Percent not allowed).
- During tool up movements, the knife is lifted to its top position.

8.10.5 Cutting quality

To obtain best quality when cutting details, as small circles, we recommend:

- Reduce the cutting speed (from Job setup).
- Cut in two or three passes, each pass going a step deeper (Multi pass (53)).

8.11 HSMU/HPMU

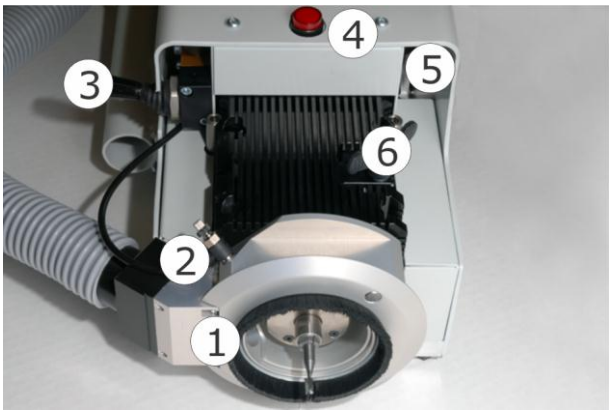
Router bits are extremely sharp!

Use Eye protection to prevent accidents caused by breaking milling bit or small pieces of processed material.

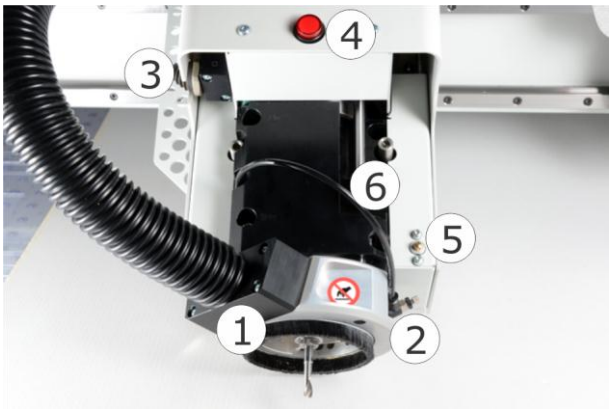
8.11.1 Introduction

Two different milling tool heads are available; HSMU and HPMU.
Both models are covered by this chapter.

8.11.2 Tool head description



HSMU



HPMU

1. Suction house with brush for chip removal. During normal operation, the house is in down position. When changing bit, the house should be locked in its upper position.
2. Air blow adjustment. Air blow is used for router bit cooling and to ease chip removal. Adjust for proper operation. There is also an air blow inside the spindle, but no user adjustment is necessary.
3. Chuck open/close. The shown position is closed.
   Note: To protect the chuck from damage and the spindle from contamination, do not close the chuck empty over time. Never start the spindle without a bit / dummy bit in the chuck.
4. Warning lamp for spindle running.
5. Air clean button to help remove contamination.
6. Locking screw for the suction house.
   Note: When in lower position, the house should be free to move up / down. Therefore, the house should never be locked when in lower position (HSMU).

1. Router bit. Shaft diameter is 6 mm (HSMU) and 6/8 mm (HPMU).
2. Chuck. The HSMU/HPMU is equipped with one 6 mm chuck on delivery.
3. Spindle.

8.11.3 Tool head mounting

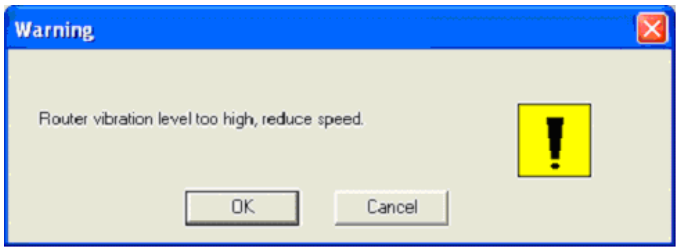
The HSMU/HPMU tool head is mounted onto the Z1 – carriage in the same way as the other Z1 tool heads.

8.11.4 Tool head park position

Use the HSMU/HPMU park position for safe tool head storage.

Note:
For safety reasons, always use a dummy bit when parking.

8.11.5 Vibration monitoring (HSMU)



To protect the spindle, a vibration monitoring system is implemented.

A warning will tell the user to reduce RPM.

If very high level occurs, the machine will stop.

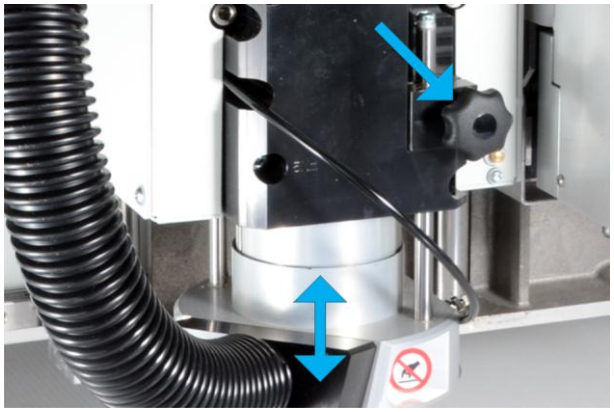
See “HSMU precautions” (171).

8.11.6 HPMU specific issues

8.11.6.1 Chiller / HPMU start up time

Depending upon the environmental temperature, the chiller needs some start-up time after power on before it is ready to operate. Typical delay is 2 – 3 minutes.

8.11.6.2 Suction house, adjustable height



On HPMU, you can lock the suction house in any height; still it is allowed to move upwards.

This function is useful in order to

- Adapt to different material thicknesses.
- Allow false air input in order to reduce suction force.

8.11.6.3 RPM limitation 1

Running 8 mm bits at a high RPM rate can generate vibrations and excessive wear.
Using bits with extended lengths at high RPM can also be dangerous.
Therefore, using long bits is subject to an automatic RPM reduction.
If you are using short 8 mm bit, these must be limited manually to 40.000 RPM.
In general, 6 mm bits are preferable in materials up to 20–25 mm thickness.

8.11.6.4 Chiller error codes

If any chiller failure occurs, look at the chiller display to see the real reason for the problem:

Code	Description
E0	Sensor failure: cable defective, connection failure, sensor defective.
IA	Water level of water flow too low.
HI	Temperature of cooling medium too high
LO	Temperature of cooling medium too low

8.11.7 HSMU/HPMU - safety issues

8.11.7.1 Suction house

Always, when executing a job, let the suction house float on top of the material. In addition to chip removal, the house reduces the risk of being hit by small work pieces or by a breaking router bit.

8.11.7.2 Eye protection

Use eye protection when working with HSMU/HPMU.

8.11.7.3 Hearing protectors

The noise generated by HSMU/HPMU highly depends upon the material processed, and running parameters. Use hearing protectors when necessary.

8.11.7.4 Spindle speed

Never use speeds higher than recommended by the bit supplier. Special care should be taken when using bits with cutting diameter larger than shank diameter.

8.11.7.5 Router bits

Router bits are very sharp - handle with care.
Never touch a rotating bit. Ensure the warning lamp is dark, and also observe that the bit is not rotating before approaching the bit.
Always insert a dummy bit before dismounting a tool head from the machine.

8.11.7.6 High temperatures

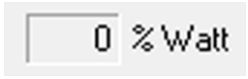
Be aware that the HSMU may become hot during operation.

8.11.7.7 Clean surface

Keep the table and material surface clean, free from obstacles.

8.11.8 HSMU/HPMU precautions

8.11.8.1 Spindle motor power consumption supervision

	The router is prepared for continuous operation between 0 – 100 % Watt. Too high spindle power consumption indicates critical conditions for the motor and immediate actions should be taken: • Use correct and sharp milling bit. • Use correct RPM for the actual bit and material. • Reduce the X/Y speed. If the motor is running above a critical limit, the execution will stop and a message is displayed.

8.11.8.2 Use of non-balanced bits

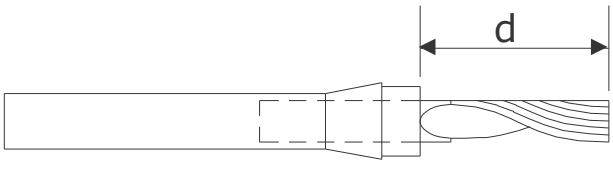
One-flute bits are by nature non-balanced, and **may destroy the spindle** if used wrong.

Therefore, one-flute bits with cutting diameters above 4 mm, 5/32 inch must be run with a **maximum RPM of**

40.000 (HSMU)

60.000 (HPMU)

8.11.8.3 Keep distance d small



For best performance and minimum wear, do not let the bit stick out more than necessary. Use bits with short cutting lengths for thin materials.

8.11.8.4 Air valve operation

Never operate the air valve while the spindle is running.

This will destroy the spindle.

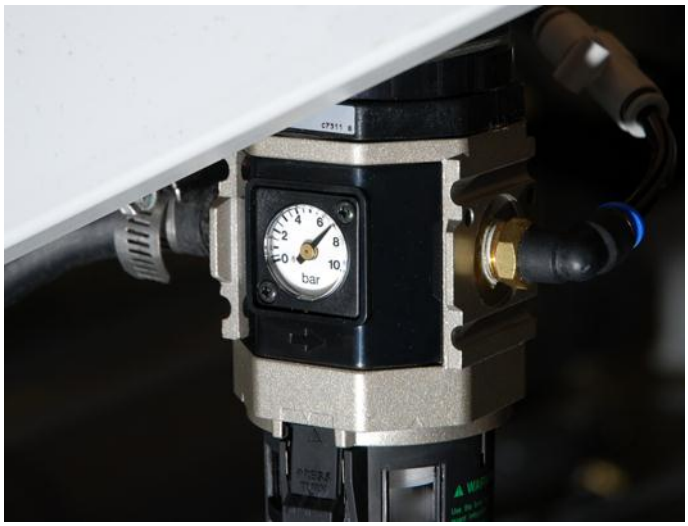
8.11.8.5 Air pressure

Never run IBAG spindle with air pressure disconnected

This may destroy the spindle.

Keep this in mind also for test purposes.

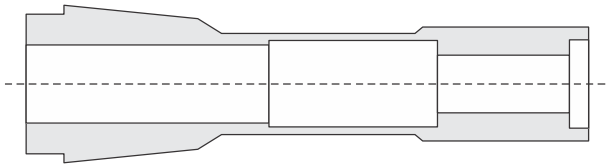
8.11.8.6 Use clean air



The spindle is sensitive for the pressurized air quality.

Regularly check the air pressure reduction valve according to the maintenance section.

8.11.8.7 Maintain bit clamping

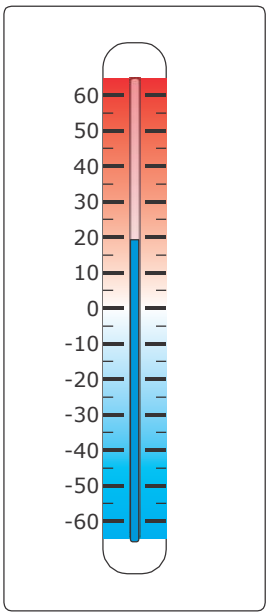


Un-proper clamping may cause the bit to slip in the chuck and **damage to the table top.**

1. Keep the bit shafts clean. Avoid greasy fingers. Clean the bit shafts with acetone if necessary, but use only dry cotton tips on the chuck.
2. Maintain air supply pressure of 7 bar.

Follow procedures for Chuck change and clean strictly.

8.11.8.8 Operation at low and high temperatures



Never run a spindle when ambient temperature is below 10 °C, 50 °F.

Continuous operation at temperatures above 30 °C, 86 °F is not recommended (HSMU)!

HPMU spindle is water cooled, thus, the ambient temperature is not that critical for the spindle itself.

8.11.8.9 Long term storage

More than 4 weeks storage of a spindle or a HSMU/HPMU requires:

- Turn the spindle by hand about 20 turn every 4 weeks.
- Spindle must be stored horizontally

8.11.8.10 Consider having a replacement spindle

If the HSMU/HPMU is used in regular production, it is recommended to have a replacement spindle.

The service interval will depend on the type of operation, and is difficult to predict. Indication of worn bearings may be increasing noise, increasing vibrations or decreasing surface finish.

Note:

When replacing a spindle, torque the motor clamp to 5 Nm, 44 lbf-in using a torque wrench. **This is a low torque for that screw size.**

Also check by hand that the spindle rotates smooth without any resistance.

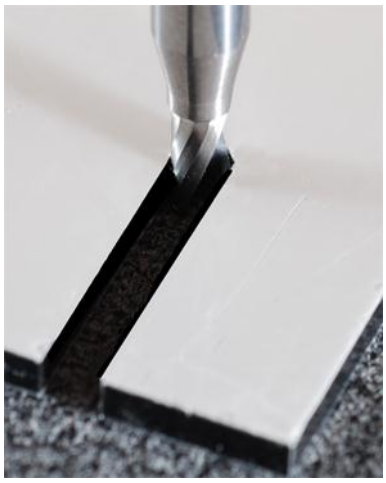
8.11.8.11 Empty vacuum cleaner in time

Do not leave the machine running if the vacuum cleaner can go full.

This might cause damage.

8.11.9 HSMU/HPMU routing advice

8.11.9.1 Milling bits



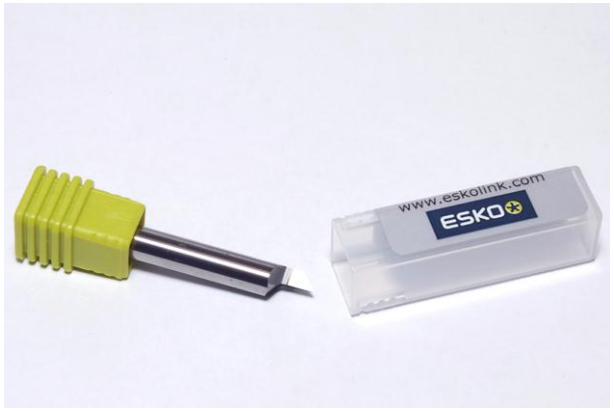
Use bits with short cutting lengths for thin materials.

For best performance and minimum wear, do not let the bit stick out more than necessary.

Never use higher RPM than recommended by the bit supplier. Special care should be taken when using bits with cutting diameter larger than shank diameter.

Bits with small cutting diameters (3-4 mm; 0.12-0.16 in) are more balanced than bits with larger cutting diameters, and can be run with higher RPM, normally 60.000.

Use large diameter bits (5-6 mm; 0.20-0,24 in) when needed to get rid of the chips in thick materials.
Max RPM (HSMU) 40.000
Max RPM (HPMU) 60.000



Edges are brittle. Never let bits touch each other, or other hard surface. Always store in proper container.

8.11.9.2 Acrylic or Multi Purpose bits

Acrylic bits (A) are polished, extra sharp for Acrylic, wood etc.

Multi Purpose bits (MP) have a higher wear resistance, and are suitable for aluface, plastics, MDF, plywood, wood etc.

MP bits can be identified by a small tooth at the tip.

8.11.9.3 Feed rates

One-flute bits do have a good chip flow, and allow for large feed rates. 0.1-0.2 mm/tooth (0.004-0.008 in/tooth) can be a starting point for optimization in most materials: This gives a feed rate of of 4-8 m/min (2.6-5.2 ips) at 40.000 RPM, and 6-12 m/min (3.9-7.9 ips) at 60.000 RPM.

Light materials like PVC foam can be run much faster.

The surface finish or the power consumption will normally determine the final feed rate for an application.

A large drop in RPM, or a high %Watt value in the display, indicate too high feed rate. Large diameter bits require more power than small diameter bits. Worn bits increase the power consumption.

8.11.9.4 Number of passes in thick materials

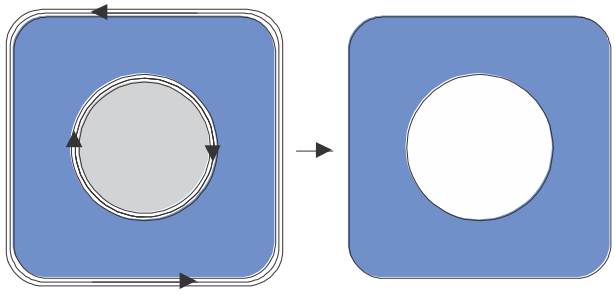
The number of passes depends on material type, thickness and bit diameter. Use a pass depth that makes the groove free of chips, normally that is a depth equal to the cutting diameter.

8.11.9.5 Material hold down

Material hold down may be a limiting factor. Especially parts cut loose can be a problem if they are small. This can be done to improve the situation:

- Use bits with smaller cutting diameter
- Cover unused table area
- Use wash-out functions instead of cutting loose small waste parts.

8.11.9.6 Milling direction



The milling direction is important in order to obtain a good result.

Correct directions, especially in foam materials, are illustrated in the figure at left.

The blue part is our product where we want the edges to be smooth and nice.

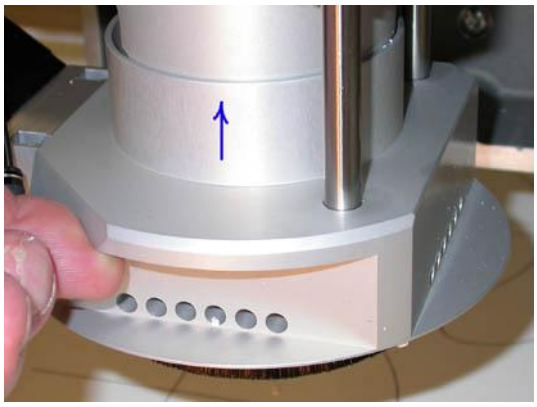
Note
Altering the milling direction is to be carried out in the CAD program.

8.11.9.7 PressCut knife tool in combination with HSMU/HPMU

It might be necessary to reduce the acceleration in order to achieve an optimal cutting quality when combining a heavy tool head with high quality cutting tools.

8.11.10 HSMU/HPMU - bits and bit change

8.11.10.1 How to insert / replace a router bit



Ensure the spindle is not running - lamp is dark.
Mind the sharp bit, and move the suction house up.

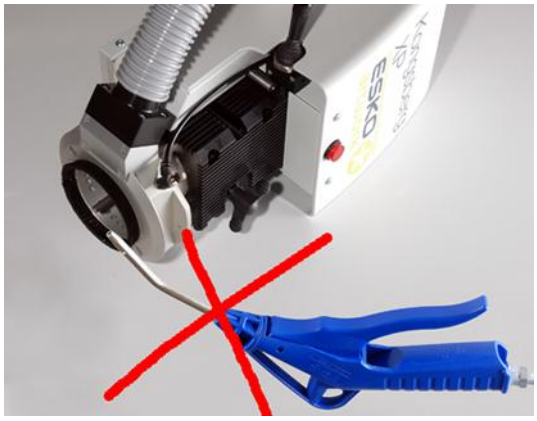
Lock the house in its up position.

Observe that the bit is not rotating.
Use a cloth to hold the bit.
Move the lever down to open the chuck.
Put the bit in a proper storage container.
Insert a new bit.
Close the chuck

Only the round part of the shaft should be inside the chuck.

See the 'HSMU/HPMU - bit length and position' – chapter for more information.

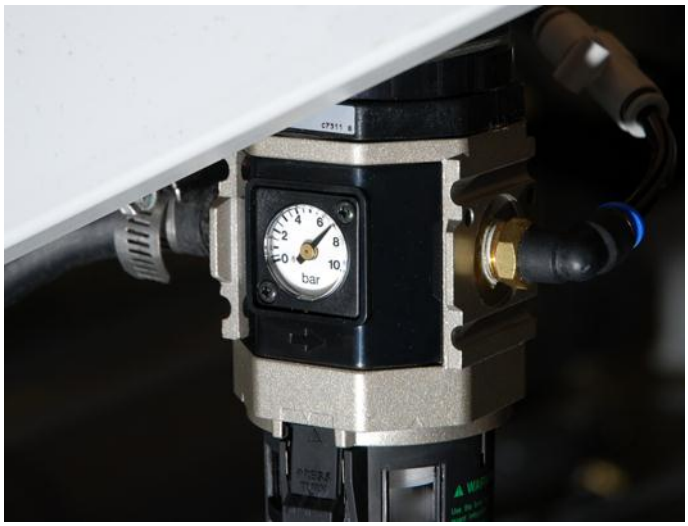
Release the lock to allow the suction house moving down to its down position.



Regularly, perform a chuck holder and chuck cleaning, following the dedicated procedure.

Note:
Never apply compressed air for cleaning.

8.11.10.2 If a bit is stuck



If a bit is stuck in the chuck, the probable cause is low air pressure.

To release a router bit from the chuck, a pressure of approximately 7 bar is required.

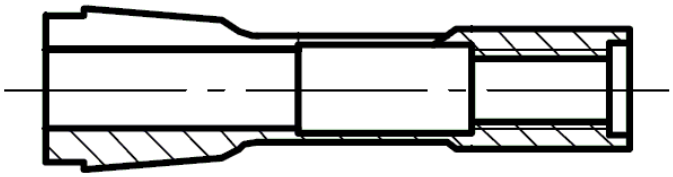
If necessary, check the table regulator setting, or the pressurized air source.

If the bit is still stuck, see the *Chuck change and clean* section how to unscrew the chuck.

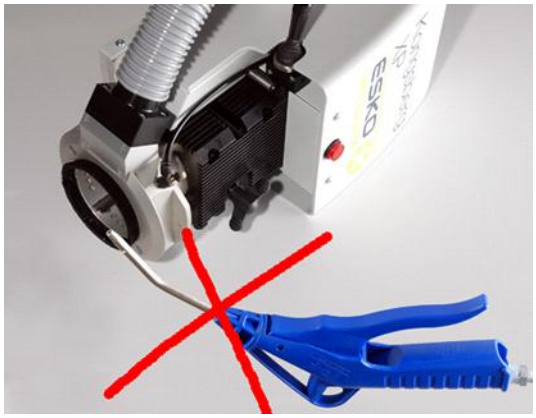
8.11.11 Chuck change and clean

Clean the taper and the chuck regularly for proper operation and optimum life time of spindle and chuck; at least once a week, but more often if necessary. Follow the procedure strictly.

Normally, the chuck has a long lifetime. Extended vibrations or impacts may hurt the chuck, and cause bad milling results. Trying a new chuck is the easiest way to identify if the chuck is the problem. Running with a bad chuck will also increases the spindle wear.



The IBAG chuck is lockable, meaning it needs no adjustment when entering the bit.

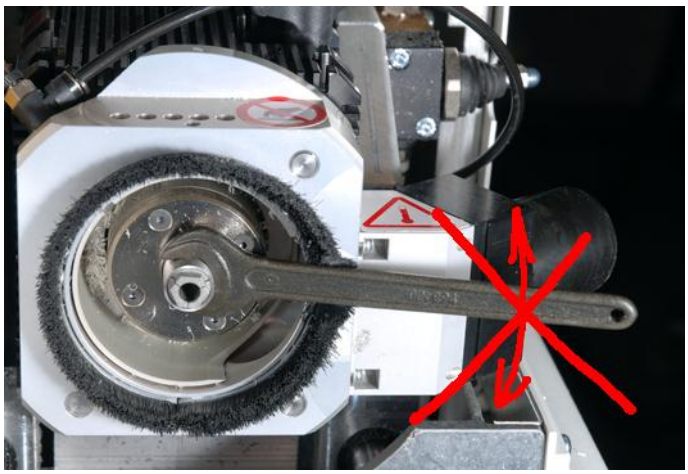


Place the tool head on the table.

Open the chuck and remove any bit.

Note:

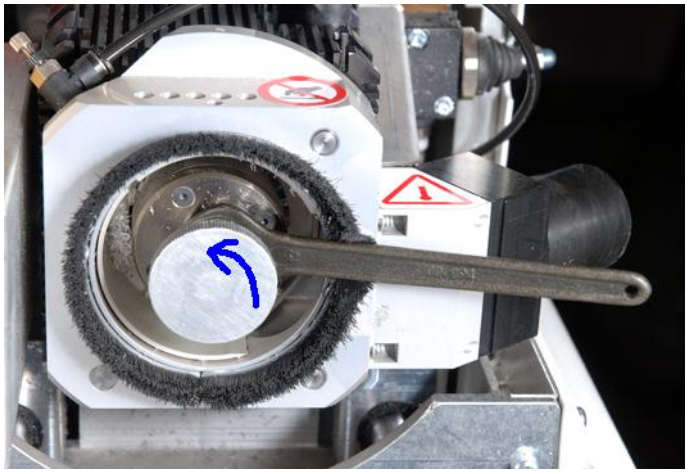
Never apply compressed air for cleaning.



Apply the 13 mm / 17 mm (HPMU) key to hold the spindle rotor.

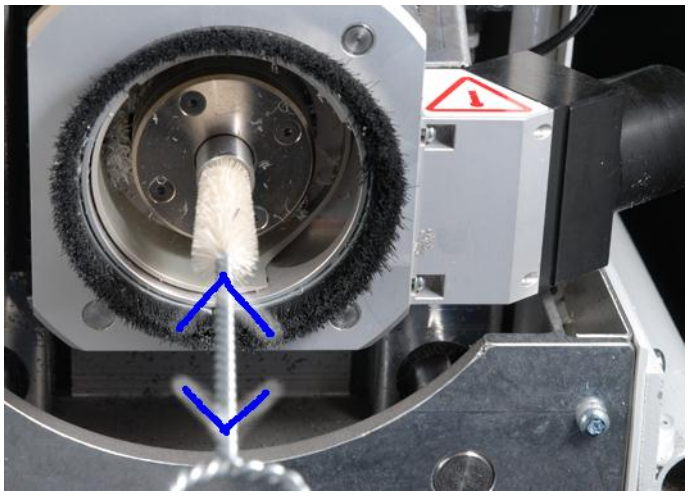
Note:
Do not turn the rotor when in CHUCK OPEN position. This might damage the spindle.

Enter the chuck tool with a dummy bit to the chuck.



Hold the rotor with the 13/17 mm key and unscrew the chuck with the chuck tool.

Note:
If you cannot move the chuck with the chuck tool, another 10 mm (12 mm for HPMU) key might be used, together with a bit, to **unscrew** the chuck. This procedure might be necessary if a bit is stuck.

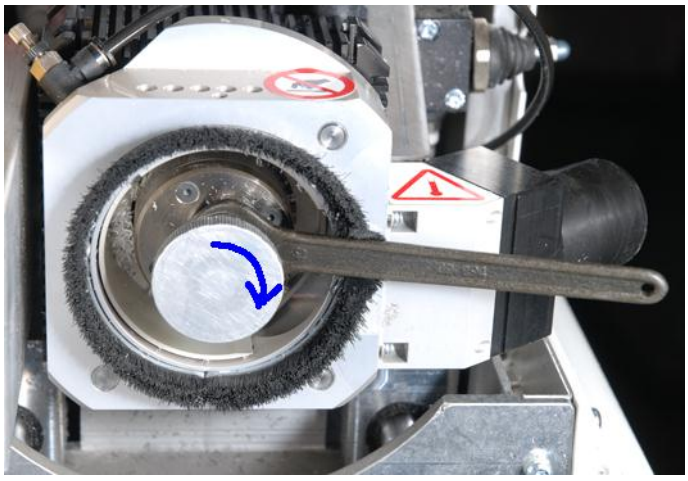


Apply the taper brush to clean the taper.

Push the air clean button to help remove contamination.

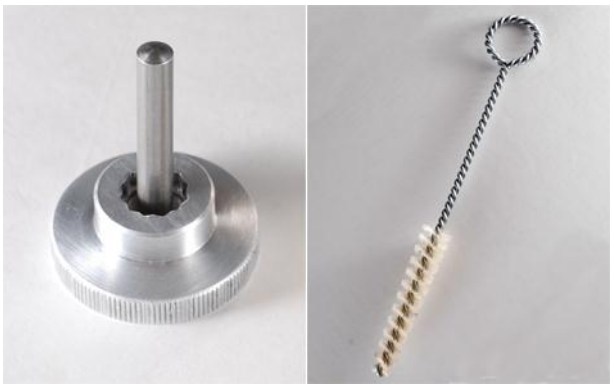
Clean the chuck.

Apply small quantities of grease to the threads of the chuck when necessary. Avoid the clamping area. Do not use oil, as it could enter the clamping area and reduce the clamping force. Also apply small quantities of grease to the outer cone of the chuck.



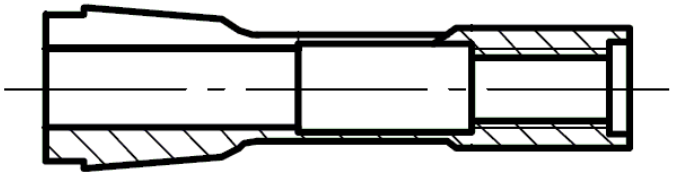
Torque up the chuck by hand, using the chuck tool and a dummy bit. (Maximum torque 2 Nm, 18 lbf-in). Hold the rotor with the 13/17 mm key.

Close the chuck on a dummy bit.



Chuck maintenance kits are available on the Esko web shop, www.esko.com.

8.11.12 Bit slipping, chuck change



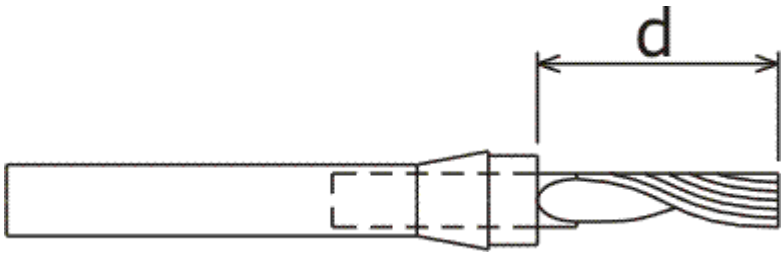
Even though the chuck is expected to have a long lifetime, replace it immediately if you experience any problems as:

- Bit slipping
- Bit vibrations

When replacing the chuck, follow instructions in Chuck change and clean – chapter.

New chucks are available from Esko store.

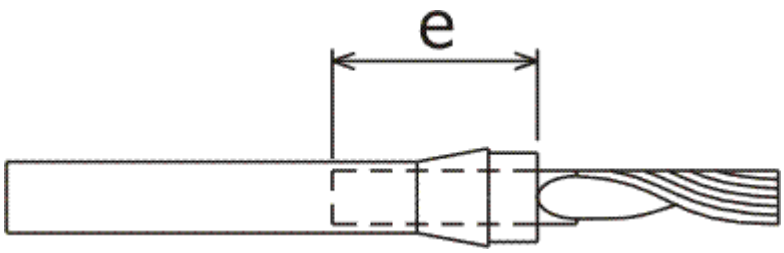
8.11.13 HSMU/HPMU - bit length and position



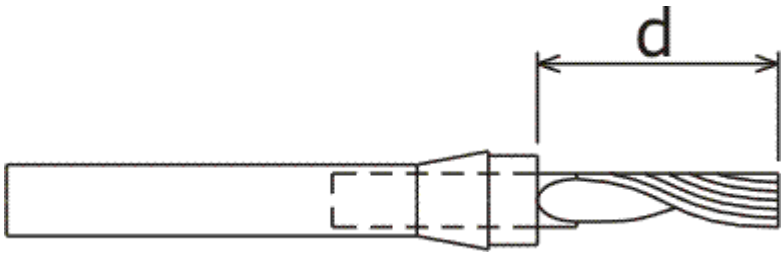
Keep distance d small.

For best performance and minimum wear, do not let the bit stick out more than necessary.

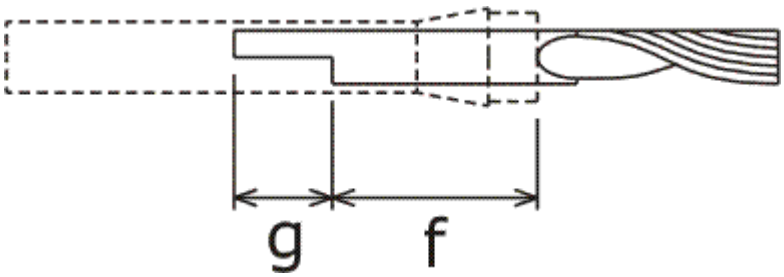
Use bits with short cutting lengths for thin materials.



For proper clamping, keep distance e 20 mm, 0.8 inch as a minimum.



To achieve material through-cut, the distance d must be at least 18 mm, 0.7 inch.



Balanced bits

Bits with balanced surface should have a clamping length f of min. 20 mm/0.8 inches. Maximum balancing length g is 12 mm / 0.5 inches.

8.11.14 HSMU/HPMU - Tool adjustment

8.11.14.1 Adjustments for the standard tool positions:

For this tool, complete the following adjustments:

- Tool height Measured automatically, possible to add an offset value.
- Tool Offset Adjust offset relative to laser pointer.

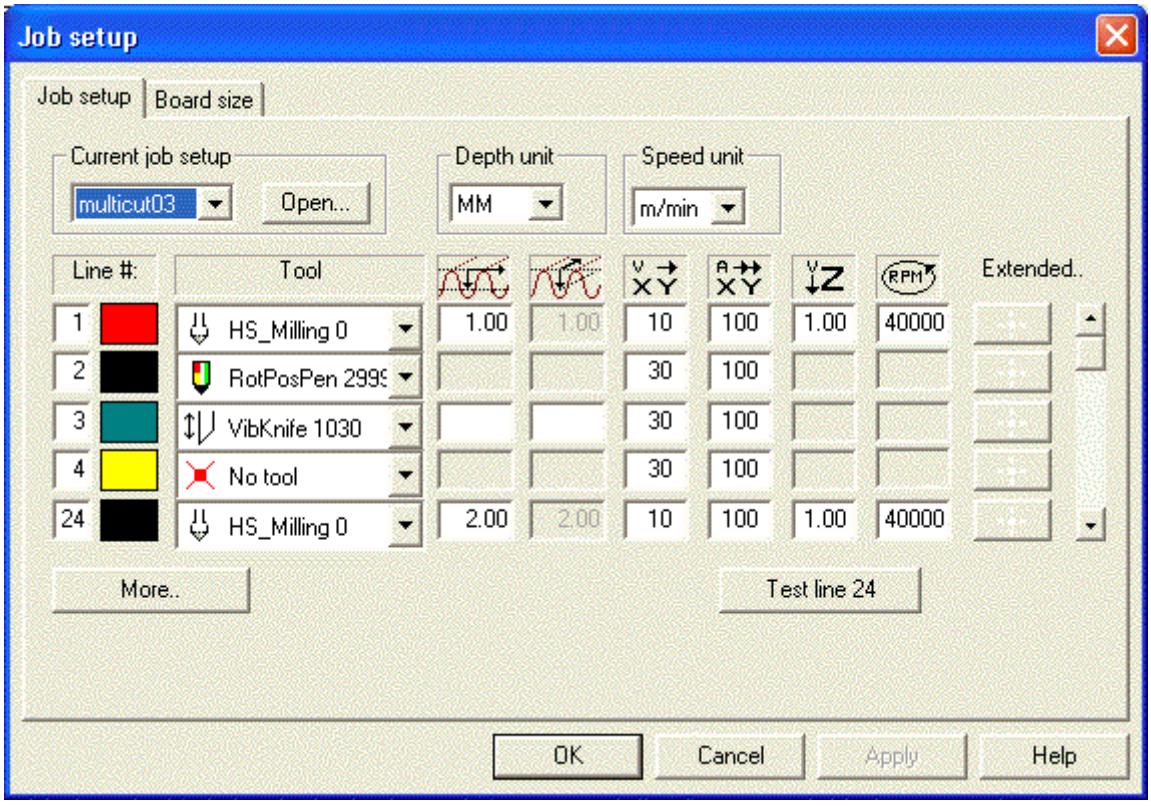
For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

Notes regarding Tool height adjustment:

- When properly adjusted, the router bit should barely touch the top surface of the material.

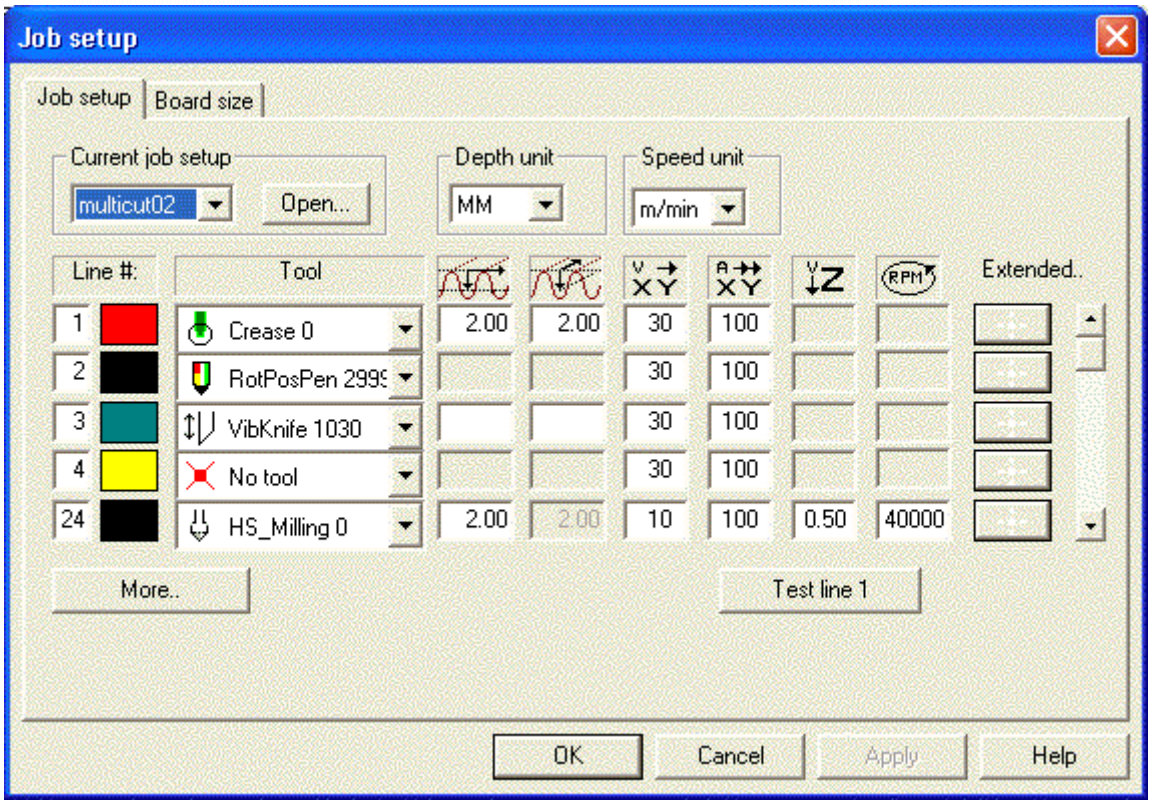
Notes regarding Tool offset adjustment:

- Before executing the wizard for tool offset adjustment, the Job setup file has to be prepared as follows:



In the first line in Job setup, specify HS milling tool with parameters as illustrated.
Then execute the wizard for tool offset adjustment.

8.11.15 HSMU/HPMU - Job setup



General information about the job setup dialog is found in the 'How to..' chapter.
In this chapter, only the Router tool specific issues are described:

Specifies the router depth measured from the top of the material. The depth is specified as an absolute value in mm or inch, or i % depending upon the 'Depth unit' setting.

Not used. Will display the same value as entered in the above line.

Specify X/Y speed in % or m/min (ips).

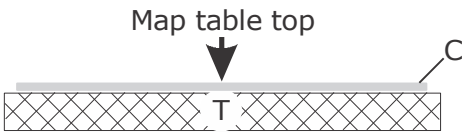
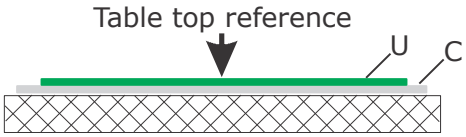
Specify X/Y acceleration in %

Specify Z-axis speed in % or m/min (ips).

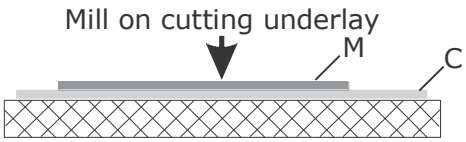
Specify speed in RPM for Router spindle.

8.11.16 HSMU/HPMU - Table top and height adjustment

8.11.16.1 The following rules apply when adjusting HSMU/HPMU:

	T = Cutting table C = Cutting underlay **Map table top** function is carried out on top of the Cutting underlay.
	U = Milling underlay The **Table top reference** function is carried out on top of the Milling underlay
	The tool height is measured automatically. If, after a test cut, you want to modify the milling depth, this is possible from the tool height adjustment dialog.

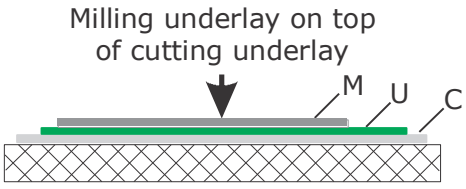
8.11.16.2 The following rules apply when milling:



Mill on cutting underlay (C):

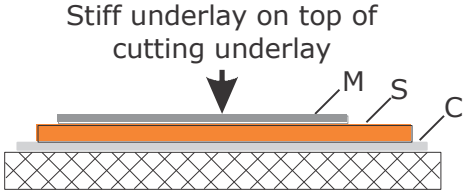
To avoid damage to the cutting underlay, the downward movement of the drill-bit is stopped 2 mm / 0.08 inch above the cutting underlay.
Thus, it is not possible to mill through the material in this case.

Tool height will follow the mapped tabletop.



Milling underlay (U) on top of the cutting underlay:

To be able to mill through the material, the thickness of the milling underlay must be > 2 mm / 0.08 inch.
If the thickness of the milling underlay (U) is < 5 mm (0.2 inches), the tool height will follow the mapped table top.



A stiff milling underlay (S) on top of the cutting underlay:

If the thickness of the milling underlay (S) is > 5 mm (0.2 inch), the underlay is supposed to be more or less stiff.
One typical milling underlay material is MDF, face milled on top.

In this case, when the underlay is supposed to be stiff, the measured 'table top reference' value is used for height control

8.11.17 Face milling

For face milling, an acm - file prepared for the actual material is required. A program dedicated for this purpose is installed together with XP-Guide.

Procedure:

Generate acm - file
From the desktop, double click the icon 'FaceMill'.
The FaceMill user interface appears on the screen.
Fill in relevant information and generate a new acm - file. Press the 'Help' button to get information about the different parameters.

XP-Guide
In XP-Guide, disable the 'Origin in lower left corner' function.
Prepare a job setup file.
A reduced acceleration is recommended (30 - 50 %). It will improve the surface quality.

8.11.18 Square cut-out

To prepare an acm - file for simple cut-out of a square, a dedicated program is available: FaceCut. This program is installed together with XP-Guide.

Procedure:

Generate acm - file
From the desktop, double click the icon 'FaceCut'.
The user interface appears on the screen.
Fill in relevant information and generate a new acm - file. Press the 'Help' button to get information about the different parameters.

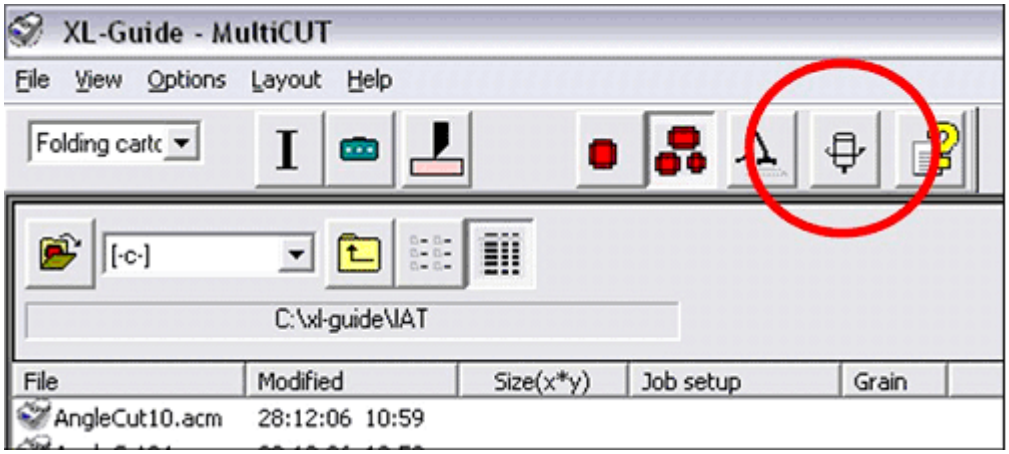
XP-Guide
In XP-Guide, disable the 'Origin in lower left corner' function, and prepare a suitable job setup file.

8.11.19 Miscellaneous

8.11.19.1 Warm Up

To protect the spindle, mandatory WarmUp is implemented.

If the spindle has been inactive for 8 hours or more, a 3 min. WarmUp is required.
WarmUp is started with this button:



If the spindle has been inactive for 4 weeks or more, an extended sequence is required, called RunIn. This takes 20 minutes.

8.11.19.2 Suction house

Clean the suction house when necessary with acetone and a q-tip. A smooth surface will ease the chip removal.

8.11.19.3 Vacuum clean the milling underlay

The vacuum cleaner can be used for automatic cleaning of the felt:

Use the FaceMill.exe to make a file that covers the actual area. Set “bit size” to 65 mm (2.5 inch), and set trim sizes to zero. Hint: Make a file name that reflect the size used. Make a job setup file with low spindle speed, zero depth, and maximum feed. Insert the dummy bit into the chuck, and adjust tool so the brush is working properly.

8.12 The VibraCut knife tool

Knife blades are extremely sharp!

8.12.1 Description

The VibraCut knife tool is available in two models:

8.12.1.1 VibraCut knife tool

Running with 6000 RPM and amplitude +/- 0.15 mm (0.006 inches), this tool is recommended for light duty corrugated materials.

8.12.1.2 High Frequency VibraCut knife tool

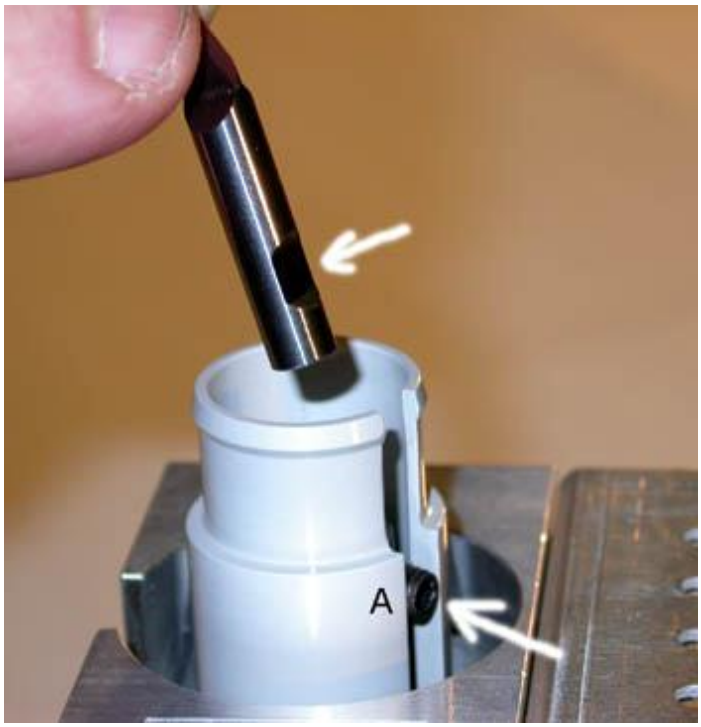
Running with 12000 RPM and amplitude +/- 0.6 mm (0.024 inches), this tool is recommended for more demanding corrugated materials.
Note: Hearing protection is recommended when working with this tool.

Common to both models:

- To reduce material tear, a foot is available.
- The same set of knife adapters can be used.

8.12.2 Replace knife blade

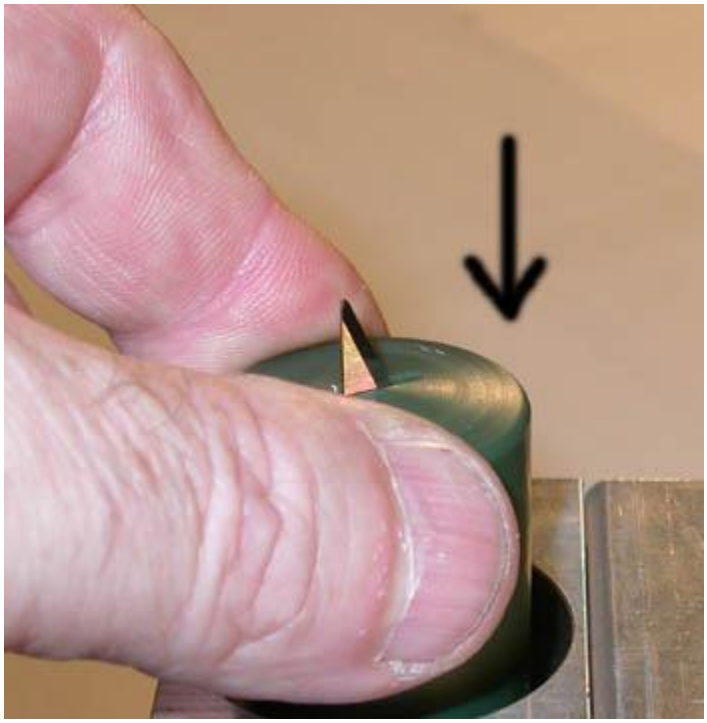
Remove the foot by pulling the foot straight out.



Loosen the screw A and replace the knife.

Ensure the knife has correct position relative to the screw.

Push the knife down while the screw is fixed.



Extreme care should be taken when inserting the knife foot again.

Keep fingers away from knife as illustrated at left.

8.12.3 Tool adjustment

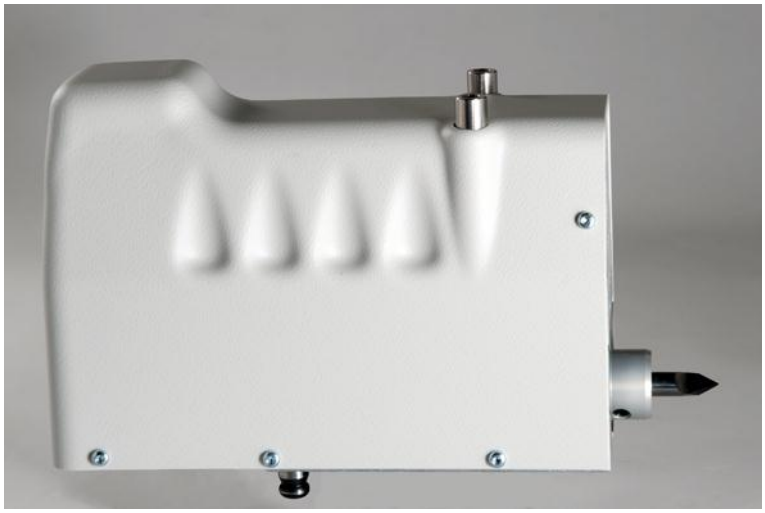
For this tool, complete the following adjustments:

Lag setting	The knife lag depends upon the blade adapter. Nominal value is 0-3 mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

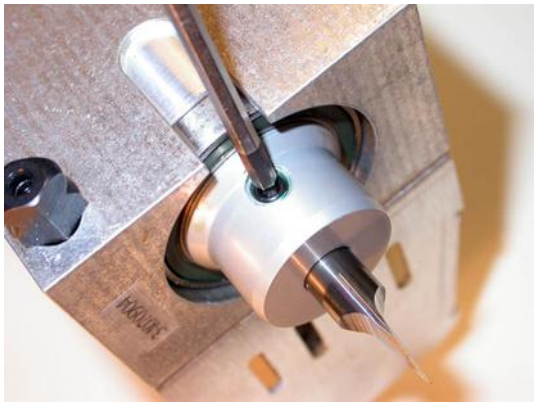
For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.13 RM Knife Tool (Rigid Material)

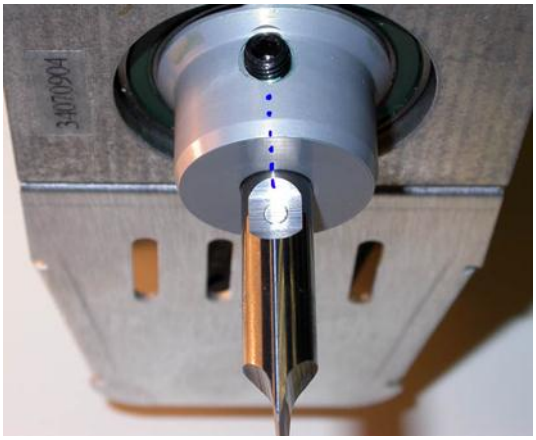
Knife blades are extremely sharp!



8.13.1 Insert / remove knife blade



Use a 3 mm Allen key to fix / loosen the knife blade.



Ensure the blade is correctly aligned.

No additional adjustments are necessary, as the tool height is measured automatically.

8.13.2 Tool adjustment

For this tool, complete the following adjustments:

Lag setting	The knife lag depends upon the blade adapter. Nominal value is 0-4 mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.

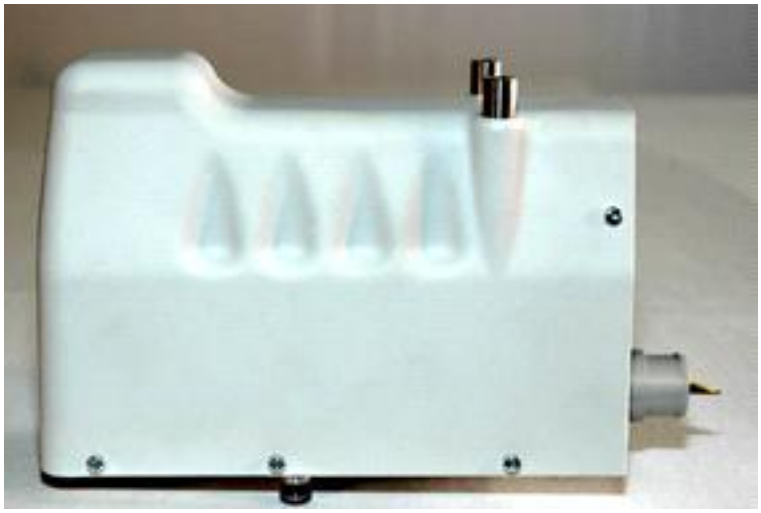
Tool Offset	Adjust offset relative to laser pointer.

For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.14 The Hi-Force knife tool

Knife blades are extremely sharp!

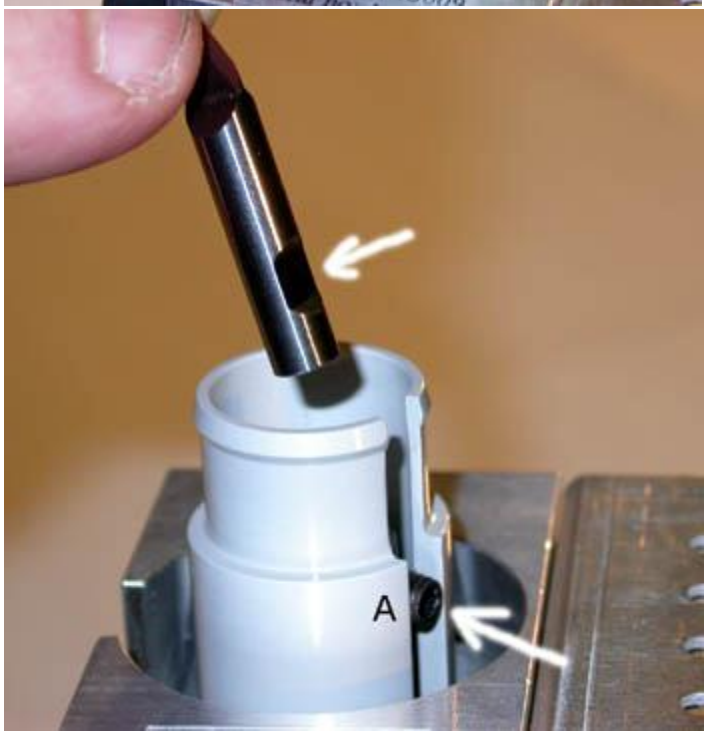
8.14.1 Description



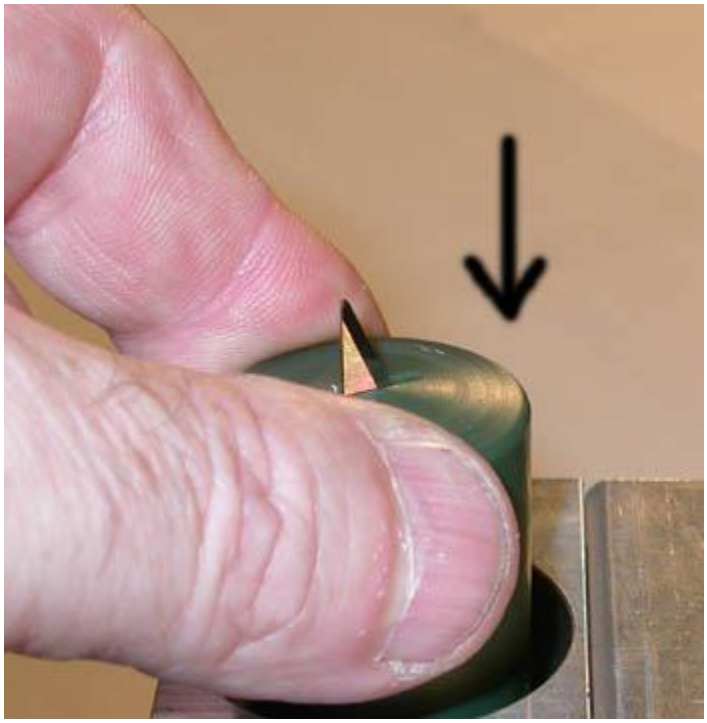
The Hi-Force knife tool is a general purpose knife tool suitable for cutting a wide range of materials. As the name indicates; this tool is prepared for a higher tool pressure compared to the Static knife tool.
The tool is prepared for a wide range of knives.
To reduce material tear and also to keep the material down as the knife is pulled out, a foot is available.

8.14.2 Replace knife blade

Remove the foot by pulling the foot straight out.



Loosen the screw A and replace the knife blade.
Push the knife blade against the bottom of the slit while the screw is fixed.



Extreme care should be taken when inserting the knife foot again.
Keep fingers away from knife blade as illustrated at left.

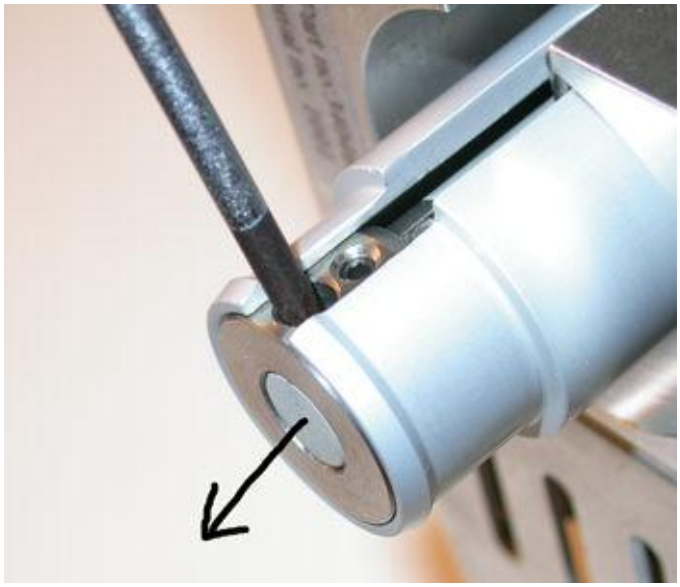
8.14.3 Tool adjustment

For this tool, complete the following adjustments:

Lag setting	The knife lag depends upon the blade adapter. Nominal value is 0-3 mm.
Tool height	Measured automatically, possible to add an offset value.
Tool rotation	Adjust tool angle tangential to moving direction.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.14.4 Replace knife adapter



To remove the knife adapter, just pull it out from the holder.

8.15 Drill / Pen tool

Drill bits are extremely sharp!

8.15.1 Tool Insert Position

If included, the Tool Insert Position is permanently mounted on the Z1 - tool position. The holder is prepared for a ball point pen or a drill tool.

8.15.2 How to insert / remove a drill / pen tool

Inserting a tool - push down until the tool is locked in position.

To remove a tool - press the release button.

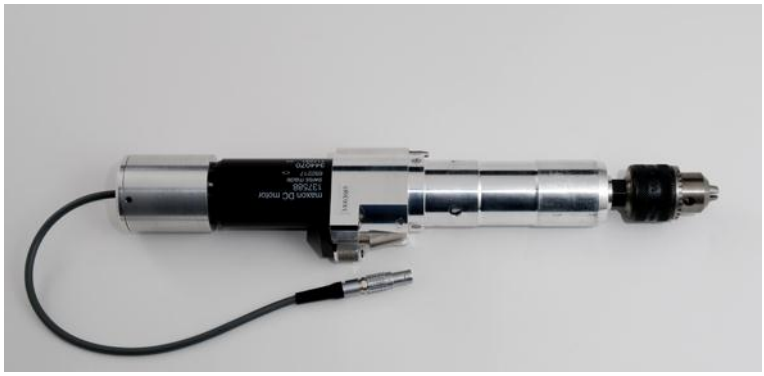
Drill motor connector:

To release, grab the housing and lift straight up.

To insert, move connector carefully down and turn it until it fits. Then just push the connector down until it is locked in position.

8.16 Drill Tool

This drill tool is for use in re-board and other paper - based materials. The tool is prepared for drill bits 0.5 – 6 mm (0.02 - 0.24 inches).



8.16.1 How to replace a drill bit

Push the drill bit towards the bottom of the chuck.
Use the wrench to fix the bit in the chuck.

No additional adjustments are necessary, as the tool height is measured automatically.

8.16.2 Tool adjustment

For this tool, complete the following adjustments:

Tool height	Measured automatically, possible to add an offset value.
Tool Offset	Adjust offset relative to laser pointer.

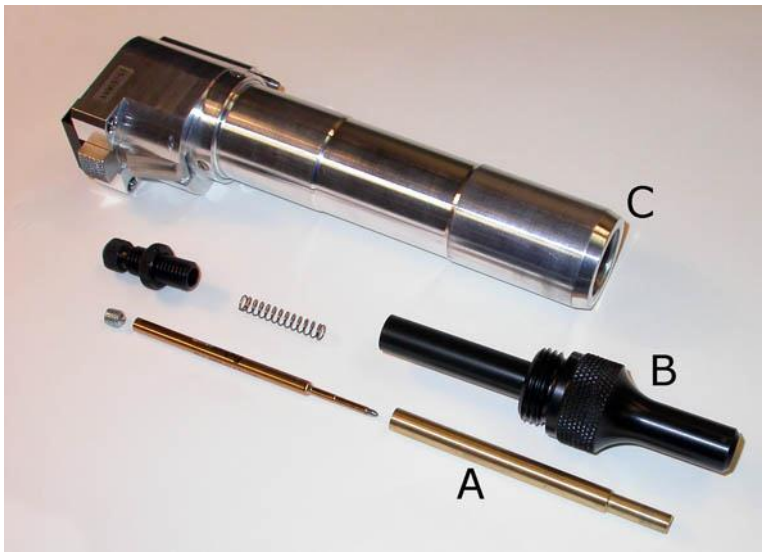
For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.17 The Ball point tool

8.17.1 Description

The Ball point pen tool is available for pen drawing.
Tool pressure is adjustable by a knob on top of the tool.

8.17.2 Tool assembly and pressure adjustment



A - Inner sleeve.

The ball point pen refill is fixed inside the sleeve using a screw.

Use Allen key, 3 mm.

B - Sleeve holder with spring and pressure adjustment knob.

C - pen tool

Adjust tool pressure using the screw s.

Lock the adjustment screw using the locking knob k.

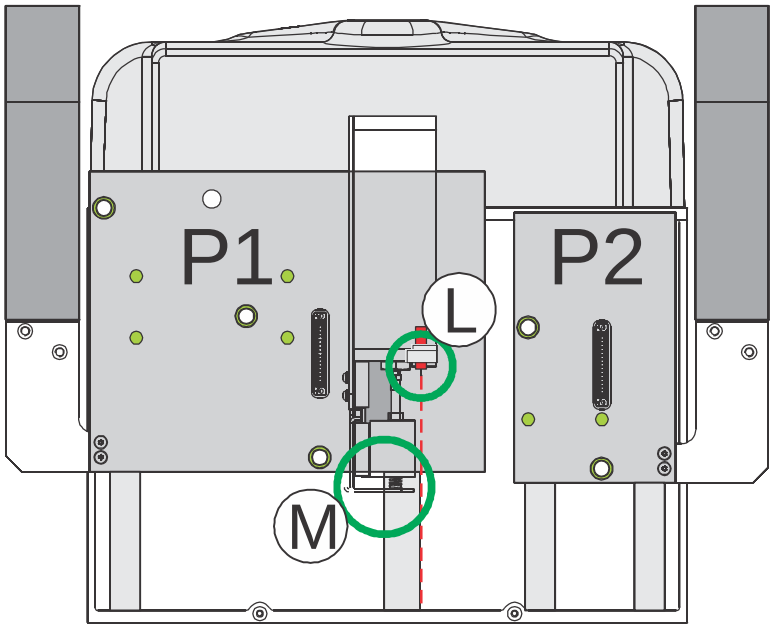
8.17.3 Tool adjustment

For this tool, complete the following adjustments:

Tool height	Measured automatically, possible to add an offset value.
Center Offset	Adjust tool sideways until centered.
Tool Offset	Adjust offset relative to laser pointer.

For more information about how to run the adjustment wizards, see the Tool Configuration chapter (116).

8.18 Measuring foot



The Measuring foot (M in the illustration) has 3 functions:

1. Measure the thickness of the material on the table
2. Map Table Top Surface.
3. Calibration of the Measuring station.

No adjustments are necessary.

8.19 Laser pointer

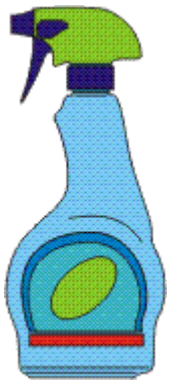
The Laser pointer (L in the illustration) is a Class II laser beam pointing device.
Wavelength: 650 nm, 1 mW.

The laser pointer is used in adjustment wizards and job execution to indicate current position on the table.

The laser pointer is lit as long as it indicates the correct current position.
If there is no manual operation of the table, the laser pointer will be switched off after a 30 sec. time out. Pressing any button on the Operators panel will switch the laser pointer on again.

9. Maintenance

9.1 General



Warning
The main power should be switched off before cleaning is carried out.

More detailed information about XP maintenance is available in the Maintenance Manual for Kongsberg XP.

9.2 Daily maintenance

Inspect

- Inspect the equipment in order to prevent any irregularities.

Clean

- The table surface should be kept clean at all times. For cleaning, use iso-propyl alcohol or white-spirit.
- The room should be cleaned regularly. Keep the cables free from grease, floor vax etc.
- Use a vacuum cleaner to keep the inside of the conveyor belt clean.

9.3 Weekly Maintenance

Guide-ways and bearings
The guide-ways and the bearings should be thoroughly cleaned and oiled very lightly with Tellus R10 oil.

Photo cells
The surface of the transmitter and receiver should be carefully cleaned using light soap and clean water.

Air pressure reduction valve
The automatic draining action of the air pressure reduction valve should be controlled:
Switch off the air compressor and allow the air pressure to fall. Switch on the air compressor and check that any water in the glass bowl of the pressure reduction valve drains out automatically during the first few seconds of operation. Remove and clean the bowl if the automatic draining action does not operate or if it appears to be an excessive amount of dust in the bowl.

Warning!
If the automatic draining action fails water can enter the tool holder assembly resulting in severe damage to the tool holder mechanism.

9.4 Monthly Maintenance

The gears in X1, X2 and Y should be re-greased using the grease gun.

Every other month, or after the table surface has been cleaned, the closed vacuum holes in the surface should be opened in order to retain the hold-down efficiency. Use a steel pin, 0.5 - 0.6 mm, and with the vacuum system switched on, free the vacuum holes by pushing the obstructions down into the table.

9.5 Maintenance, external equipment

All external equipment, as PC, Vacuum pump and compressor should be maintained according to the User Manual for the actual equipment.

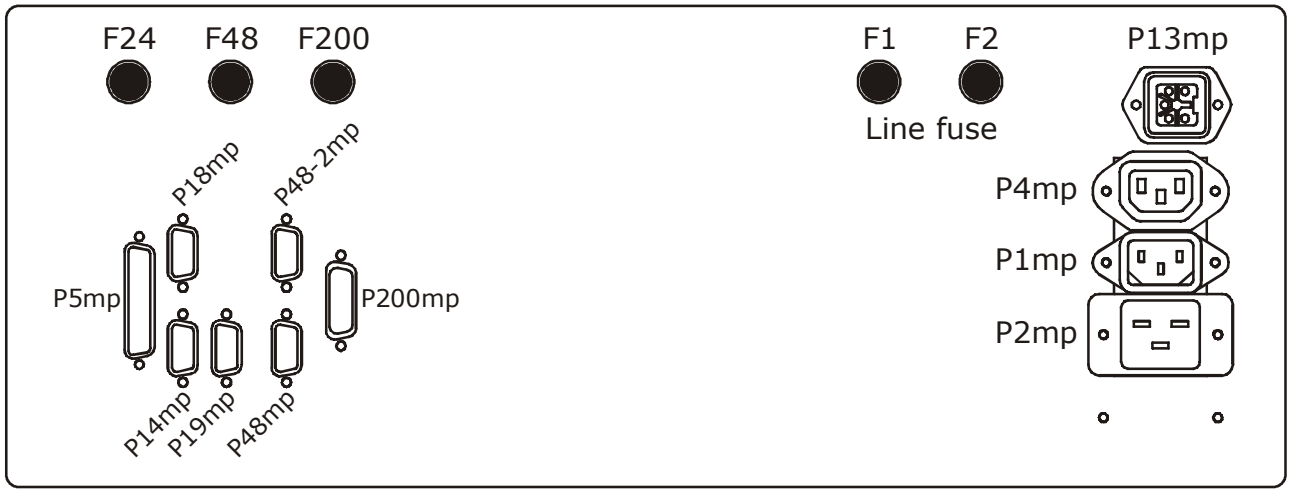
10. Fuse replacement

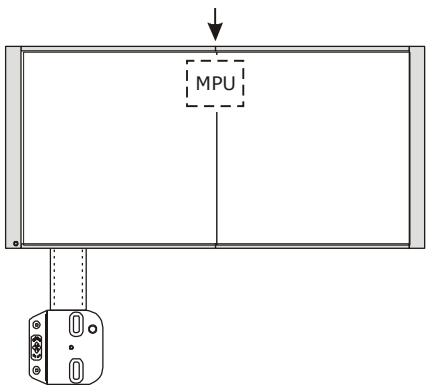
Switch power off with the Main Power switch before starting the fuse replacement procedure.
Remove the main power plug from the wall socket as an extra precaution before starting the fuse replacement procedure.

10.1 MPU fuses

Fuse location	115V	230V
Line fuses F1 and F2	T 15A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)	T 6,25A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)
200V Servo power fuse F200	T 15A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)	T 15A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)
48V Servo power fuse F48	T 8A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)	T 8A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)
+24V fuse F4	T 6.25A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)	T 6.25A 250V 1 1/4 x 1/4 in (6,3 x 32 mm)

All fuses are located on the rear side of the Main Power Unit (MPU):

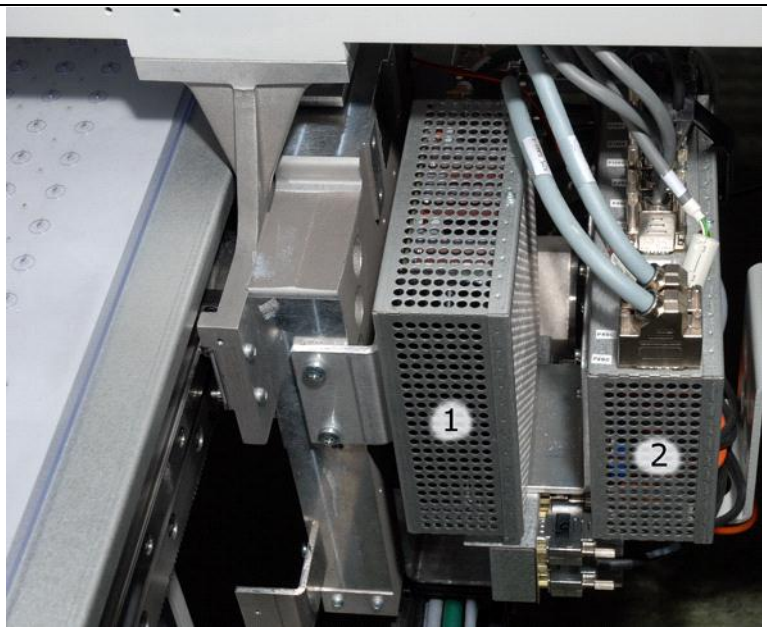




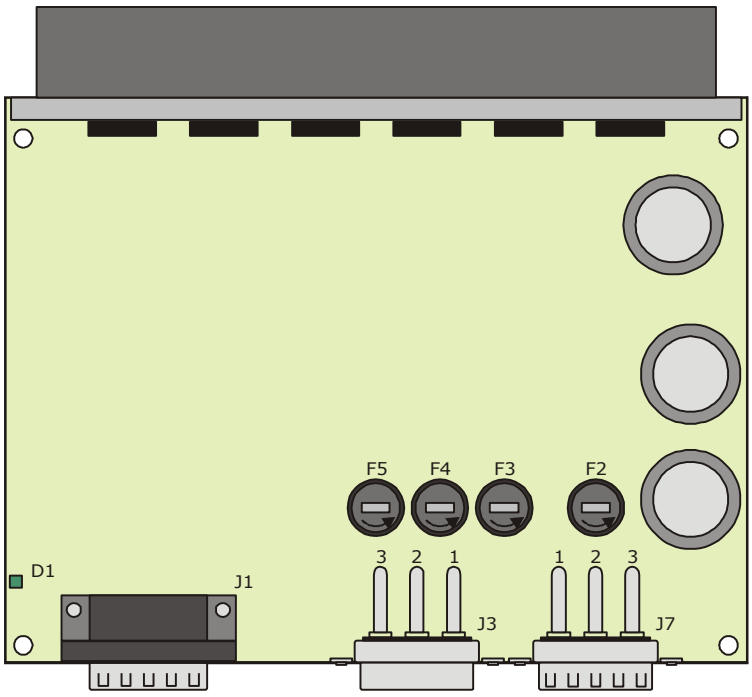
Fuse replacement procedure:

1. Remove base cover in front of MPU
2. Remove one fuse, check with ohm - meter, if blown, replace with a new identical fuse. Repeat for each fuse.
3. Replace base cover
4. Insert main power cable into the wall socket and turn main power ON.

10.2 X1 fuse



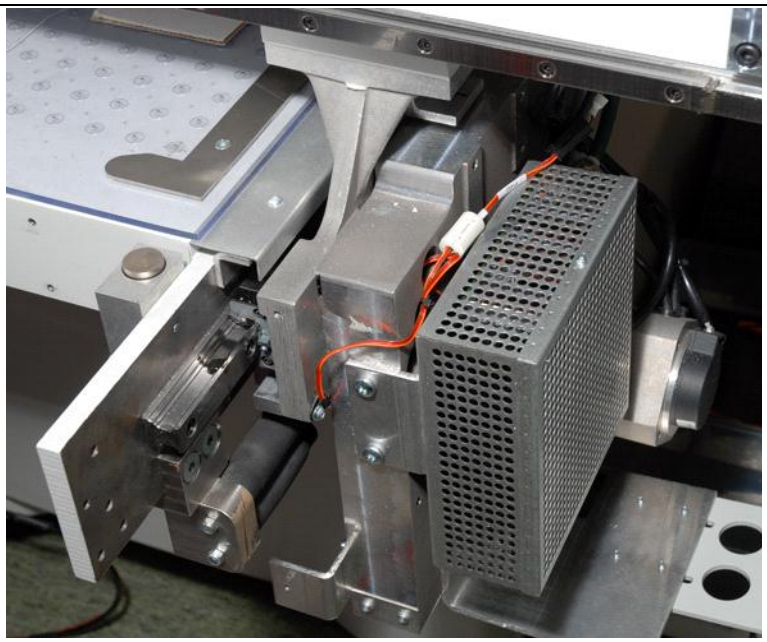
1 – 8/24A AC amplifier X1
2 – SCU unit

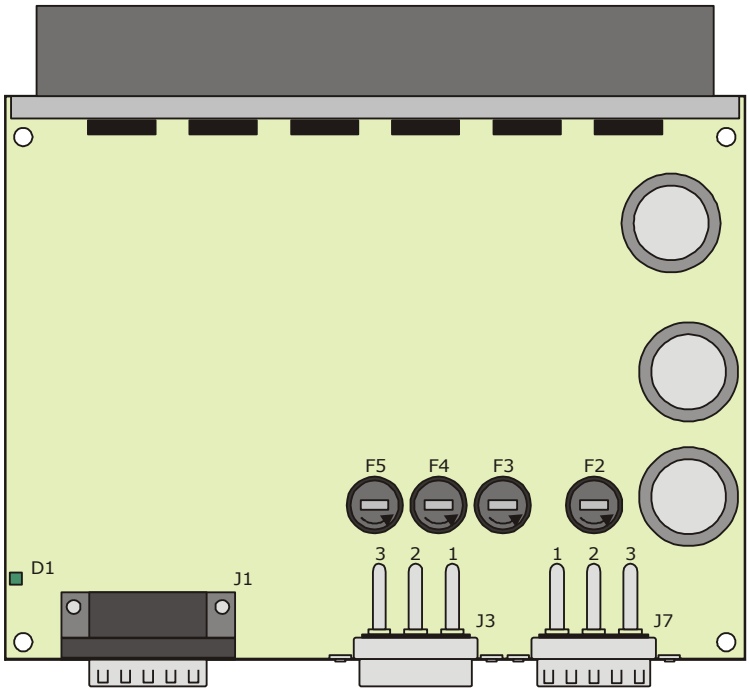


1. Remove X1 cover.
2. Remove cover from AC amplifier unit.
3. Check fuses F2 – F5 with ohm - meter. If blown, replace with a new identical fuse.
4. Replace covers.
5. Insert main power cable into the wall socket and turn main power ON.

Fuse: T 10A 250V (5 X 20 mm).

10.3 X2 fuse

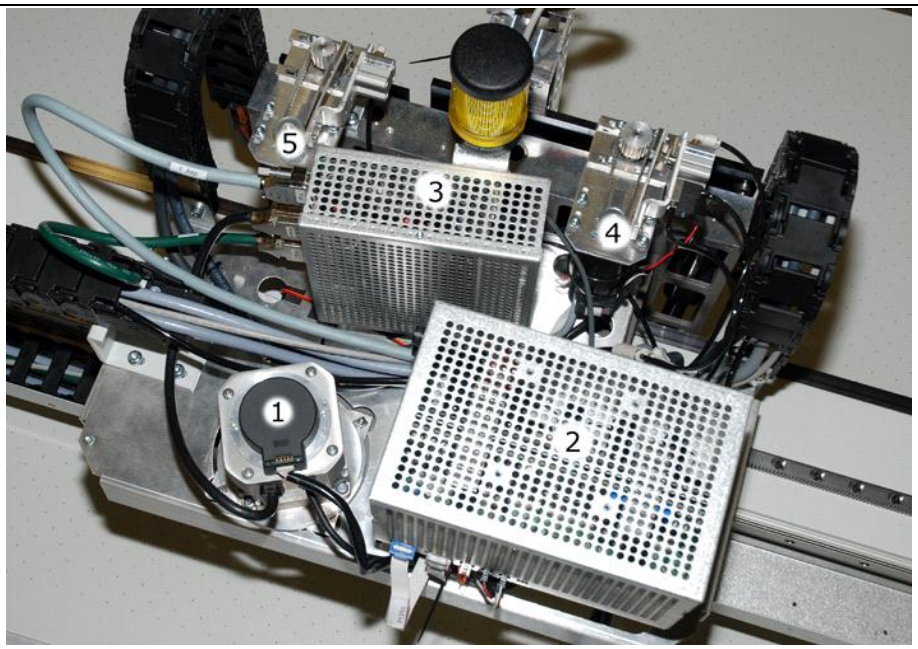




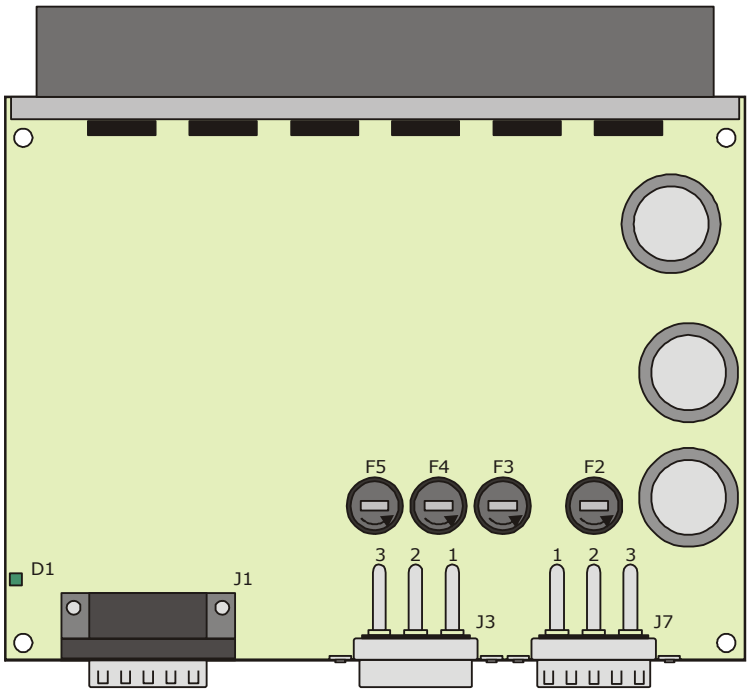
1. Remove X2 cover.
2. Remove cover from AC amplifier unit.
3. Check fuses F2 – F5 with ohm - meter. If blown, replace with a new identical fuse.
4. Replace covers.
5. Insert main power cable into the wall socket and turn main power ON.

Fuse:
T 10A 250V (5 X 20 mm).

10.4 Y fuse



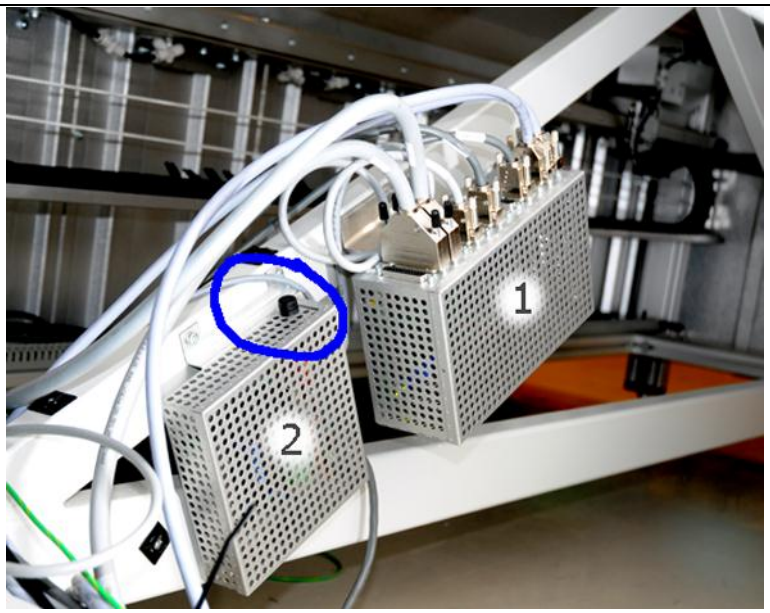
1 – Y-motor with encoder.
2 – TCU.
3 – AC amplifier for Y.
4 – Z1 – motor.
5 – Z2 – motor



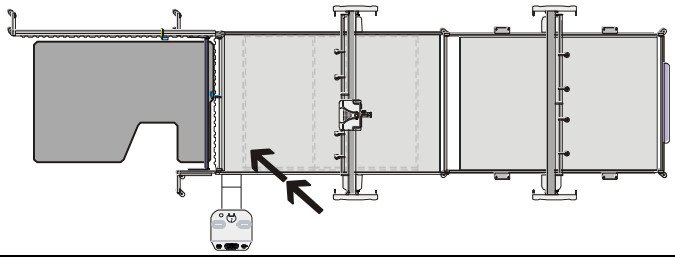
1. Remove Y cover.
2. Remove cover from AC amplifier unit.
3. Check fuses F2 – F5 with ohm - meter. If blown, replace with a new identical fuse.
4. Replace covers.
5. Insert main power cable into the wall socket and turn main power ON.

Fuse:
T 10A 250V (5 X 20 mm).

10.5 In-stack camera motor fuse



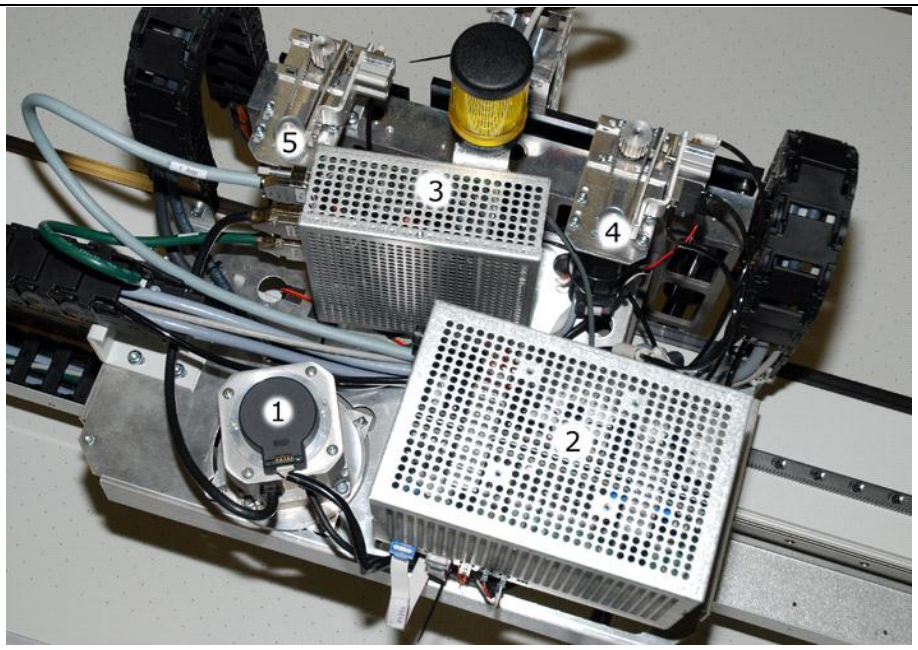
1 – LCU.
2 – 3/6A amplifier for In-stack camera motor.



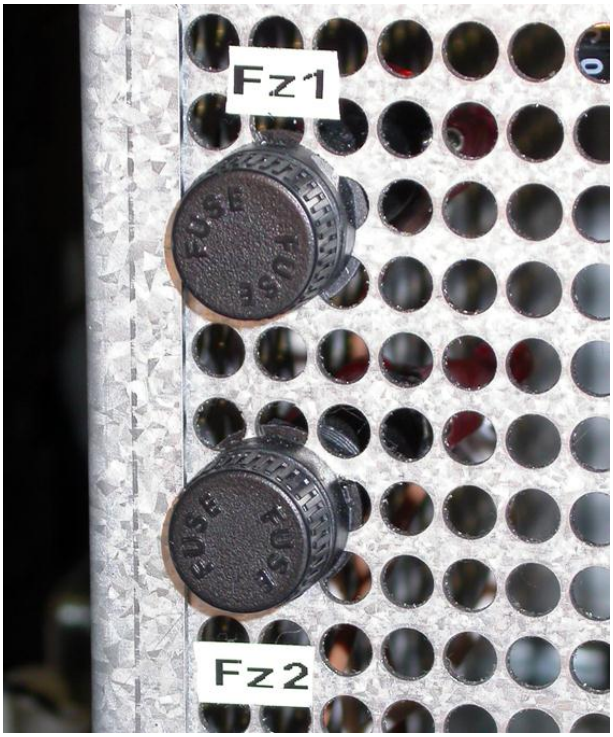
1. Remove side cover.
2. Check fuse with ohm - meter. If blown, replace with a new identical fuse.
3. Replace cover.
4. Insert main power cable into the wall socket and turn main power ON.

Fuse: T 4A 250V 1 1/4 x 1/4 in (6,3 x 32 mm).

10.6 Z1 / Z2 fuses



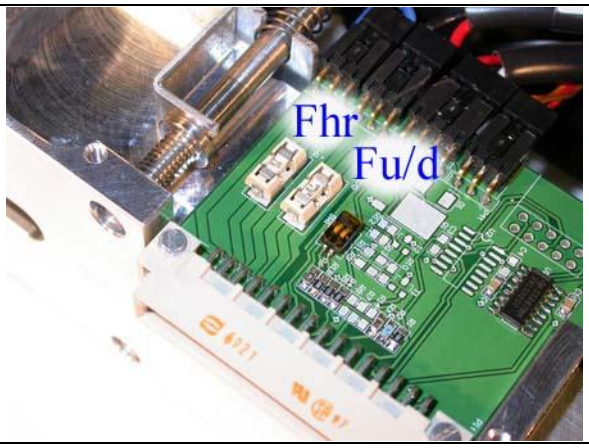
1 – Y-motor with encoder.
2 – TCU.
3 – AC amplifier for Y.
4 – Z1 – motor.
5 – Z2 – motor



1. Remove Y cover.
2. On the TCU – unit, check fuses Fz1 and Fz2 with ohm - meter. If blown, replace with a new identical fuse.
3. Replace covers.
4. Insert main power cable into the wall socket and turn main power ON.

Fuse: T 4A 250V 1 1/4 x 1/4 in (6,3 x 32 mm).

10.7 Fuses: Tool rotation / Reciprocating knife



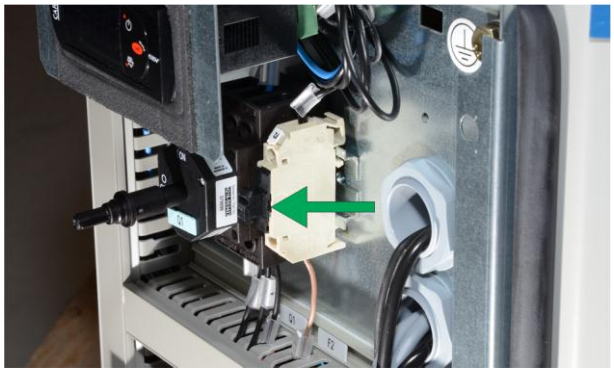
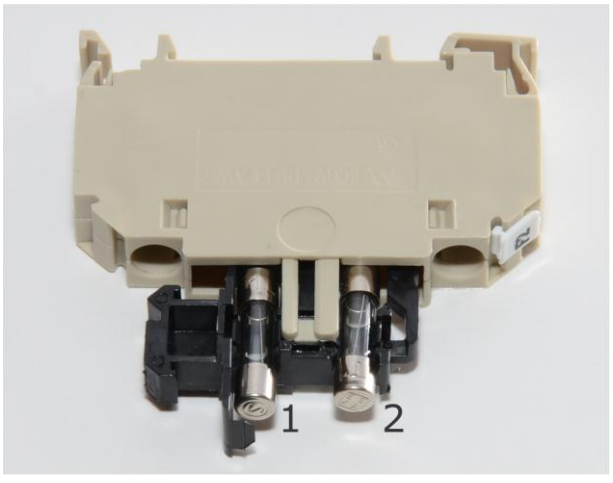
1. Fuses are available on the Tool Board inside the actual tool.
2. Remove the plastic cover on the tool.
3. Remove fuse Fhr or Fu/d, check with ohm - meter. If blown, replace with a new identical fuse.
4. Insert main power cable into the wall socket and turn main power ON

For information about fuse sizes, see table below.

(Esko-Graphics part number)

Drill tool	Drill	FDr	2	T 2A 125V NANO (42441618)
Hi-force knife tool	Tool rotation	Fhr	2	T 2A 125V NANO (42441618)
Hi-Freq VibraCut knife tool	Tool rotation	Fhr	2	T 2A 125V NANO (42441618)
Hi-Freq VibraCut knife tool	Vib.	Fu/d	4	T 4A 125V NANO (42444828)
Presscut knife tool	Tool rotation	Fhr	2	T 2A 125V NANO (42441618)
Presscut knife tool	Tool u/d	Fu/d	0.75	T 0,75A 125V NANO (42442541)
RM knife tool	Tool rotation	Fhr	4	T 4A 125V NANO (42444828)
RotaCut	Knife RPM		2	T 2A 125V NANO (42441618)
VariCut knife tool	Tool rotation	Fhr	2	T 2A 125V NANO (42441618)
VariCut knife tool	Knife depth	Fu/d	0.5	T 0,5A 125V NANO (42441600)
VibraCut knife tool	Tool rotation	Fhr	2	T 2A 125V NANO (42441618)
VibraCut knife tool	Vib.	Fu/d	2	T 2A 125V NANO (42441618)
HDU	Tool rotation	Fhr	4	T 4A 125V NANO (42444828)

10.8 HPMU Chiller fuse

Remove the on/off button	Remove cover (4 screws)
	
Fuse location	Pull out the fuse holder
	
Turn the fuse holder 90 deg.	Now you have easy access to the fuse. 1 - Spare fuse 2 - Fuse in action Fuse: T 1A 250V (5x20 mm)

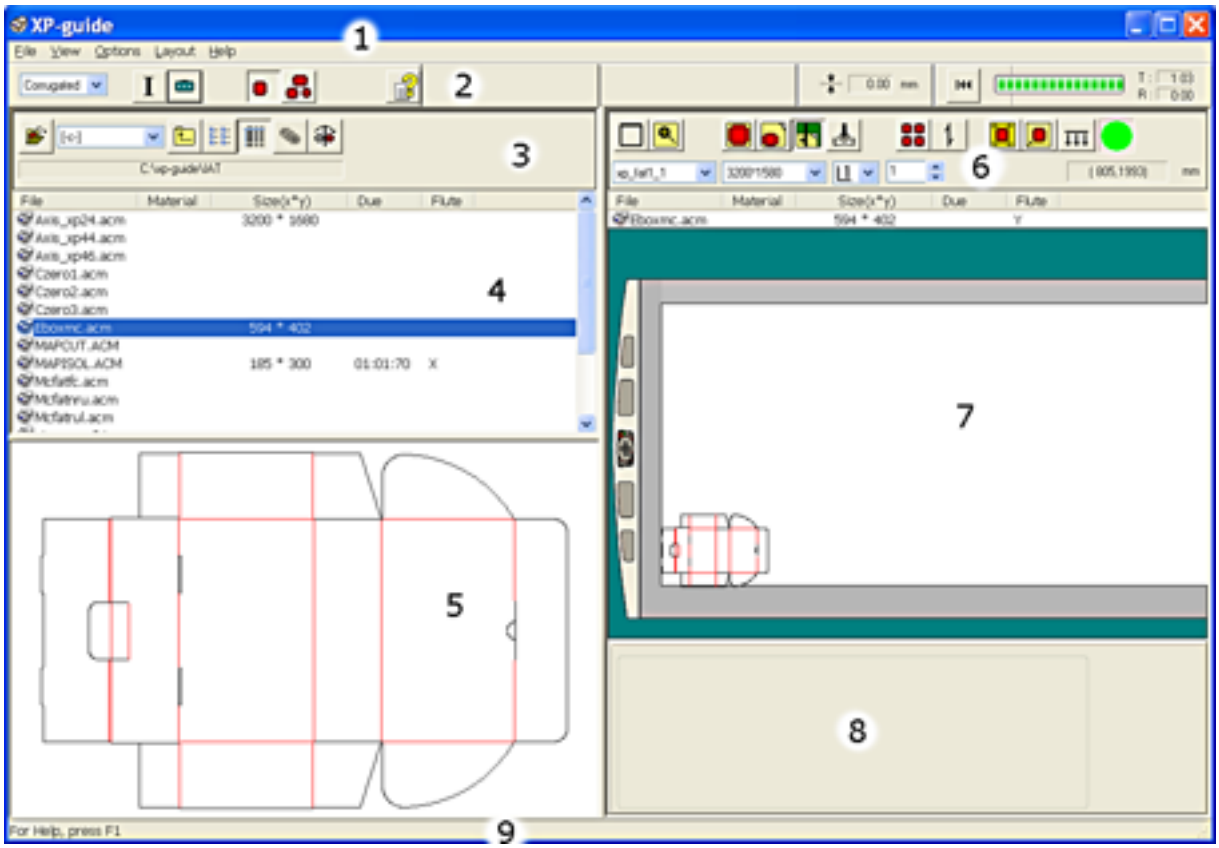
10.9 HPMU Chiller heater fuse

	F= 4A 250V T 5x20mm Slow Blow (42448944)

11. Appendices, introduction

The appendices section of this manual contains mainly reference information.
Much of this is available also in the context-sensitive help included in XP-Guide.

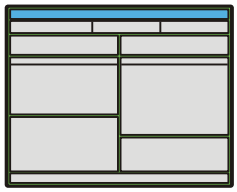
12. Appendix - The Graphical User Interface



The XP Graphical User Interface (GUI) contains these main elements:

1 Main Menu
2 Main Toolbar
3 File View Toolbar
4 File View
5 Preview
6 Job View Toolbar
7 Job View
8 ARS Toolbar
9 Status Bar

12.1 The Main Menu



The following functions are available from Main Menu and sub-menus:

12.1.1 File

Open	Open an Input File (109).
Exit	Terminate XP-Guide.

12.1.2 View

Position Display	Display of table positions and parameters (231).
View Messages	Message Display; provides a log of system messages (230).
Customize File View	File View configuration (221).
View Finished Jobs	List finished jobs when running in Auto Open mode (223).
Tool bars	Show/hide Main tool bar and/or Progress bar.
Status Bar	Configure Status Bar (228).
System Report	Wiew a standard report (147).
Jobs Executed	Wiew a standard report (147).

12.1.3 Options

Tool configuration	Tool configuration and adjustments (116).
Job Setup	Select and edit job setup files (100).
Board Size setup	Edit table of available board sizes (123).
Toggle Flute Direction	Specify actual flute/grain direction to the system (123).
Transformation	Specify scale and rotation (124).
Step and Repeat	Specify multiple copies of current job (126).
Counter setup	Parameter setting for crease using a matrix (127). (For folding carton only).
System Option	Enter the System Option dialog (96).
Table Options	Enter the Table setup dialog (92).
Registration setup	Configure the ARS system (132).

Remote Alert System Setup	Configure the Remote Alert system (144).
Order ID	Enter the Order ID dialog (147).
Report options	Configure the reporting system (146).

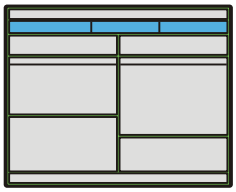
12.1.4 Layout

Toggle Layout Mode	Toggles between single and multi design layout (113).
Layout setup	Job layout configuration (113).
Delete	Delete selected design (113).
Delete All	Delete all designs (113).
Select All	Select all designs (113).
Rotate 90	Rotates selected design 90 degrees (113).
Rotate 180	Rotates selected design 180 degrees (113).
Rotate.	Rotates selected design a user defined angle (113).

12.1.5 Help

About XP-Guide	XP-Guide version information. Information about maintenance intervals. You will find more information about this issue in the Technical Manual for XPA.
Help	Enter the online Help system.
User Manual	A link to this document.
How to get started	A link to this document.
Show the welcome dialog	Toggle function; show welcome dialog after XP-Guide startup.

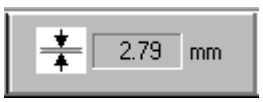
12.2 The Main Toolbar functions



The left part of the Main Toolbar contains the following general functions:

	Selects application from the drop down list. For details, see Technical Reference manual.
	View the Message Display (230).
	Enter Tool Configuration (116).
	Set Single Design operation (113).
	Set Multi Design operation (113).
	Enable queue system (110).
	Start HSMU/HPMU spindle warm up (HSMU/HPMU only).
	Start vacuum cleaner (HSMU/HPMU only).
	Manual load (45).
	Enter the Help system.

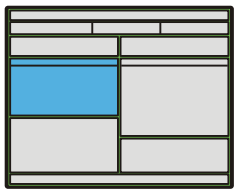
The right part contains the following functions:

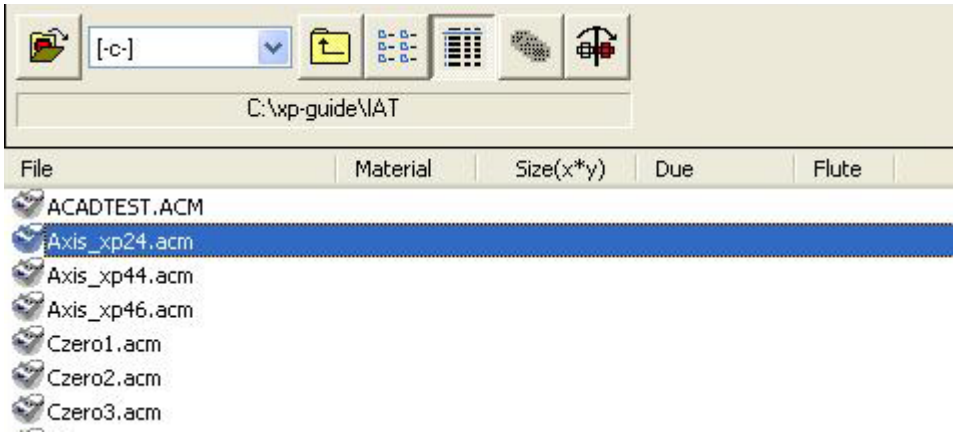
	Shows measured thickness of material on the table.
	Rewinds current job.
	T: Estimated total job time. R: Estimated remaining job time.

12.2.1 Main Toolbar configuration

From **View->Toolbars**, you can configure the Main toolbar to show left / right / none of the Main toolbar.

12.3 File View





A total of 5 columns can be displayed in the **File View**.
The file name is always displayed in column 1.
The other 4 columns can be customized in the **Customize File View** dialog.

The files in the **File View** are sorted in normal or reversed order. The sorting is toggled by clicking the header of the columns.

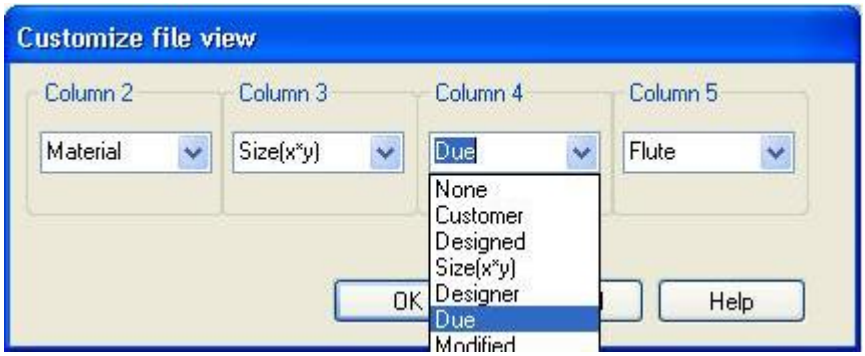
The files are ranged the way they will be executed when **Auto Open** is activated.

A single click on a file will display the design in the **Preview** window.
When a file is opened, that is selected as a job; the design will be displayed in **Job View**.

12.3.1 Customize File View

The Customize File View – dialog is available from:

- **Main Menu->View->Customize File View**
- **File View->Pop-up menu**

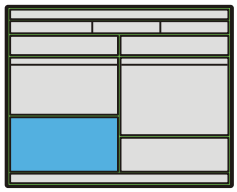


Use the **Customize File View** dialog to define the kind of data which you want displayed in the columns in **File View**.

Customize the 4 columns by selecting the appropriate field in the drop down list.

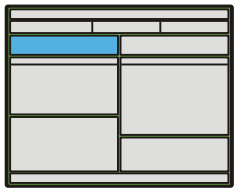
The content of the different fields are File Header - parameters in the **Input File**, except from the Size, which is calculated after the file has been opened.

12.4 Preview



A single click on a file in File View will display the job in the Preview window.

12.5 File View toolbar



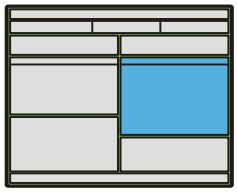
You will find the following buttons in the File View toolbar:

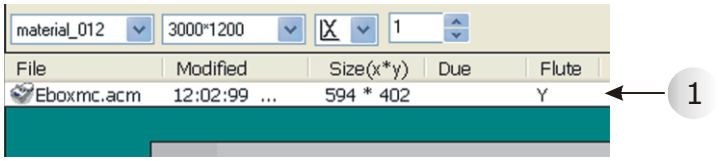
	Opens selected file.
	Selects disk drive for input files.
	Up one level.
	Shows file names only.
	Shows file names and details.

12.5.1 Auto Open function

	Enable 'Move finished file' – mode. Moves the current job, when finished, to a sub-directory and removes it from the list of files in the File View. Press the button a second time to disable the 'Move finished file' – mode. Note: You can view finished job by selecting **View->View Finished Jobs** on the menu or by selecting View finished job from the pop-up menu in the file view.
	Auto Open function Pressing this button activates the Auto Open function. The file at the top of the File View list will automatically be opened as a new job when the current job is finished. Press the button a second time to disable the 'Auto Open' – function. Note: It is a pre-requisite for this function that the 'Move finished file' – mode is enabled.
	When the 'Move finished file' – button shows this face, it indicates that the 'Move finished file' – mode is disabled – no automation.

12.6 Job View





When you open a file, the design is displayed in the **Job View** window.

Designs placed in **Job View** can be manipulated according to the selected layout mode.

Various display options are available from the **Job View toolbar**.

12.6.1 File information

File information is available from the **File Information Bar** (1) on top of **Job View:**

In Single design / Multi design mode:

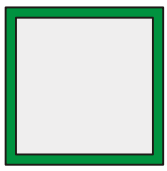
- Information about the last input file is displayed.

In Input Queue mode

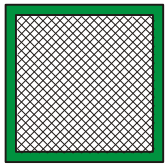
- The queue is displayed.

12.6.2 No sheet / sheet on table information

Current setting of this parameter is indicated in the **Job view** work area graphics:



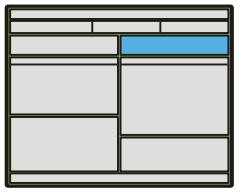
This work area background indicates that there is no sheet on the cutting table.

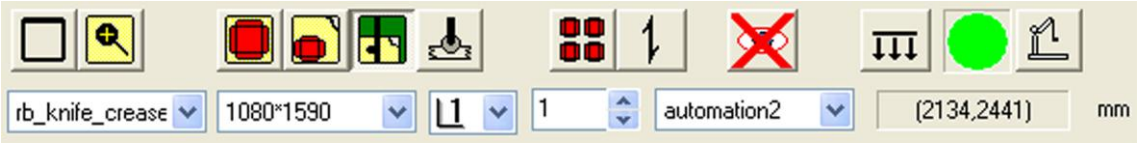


This work area background indicates that there is a sheet on the cutting table.

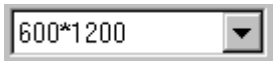
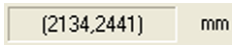
To modify this parameter, see **Production control** dialog (227).

12.7 Job View toolbar

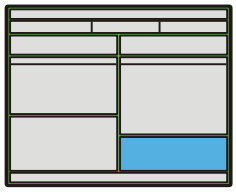


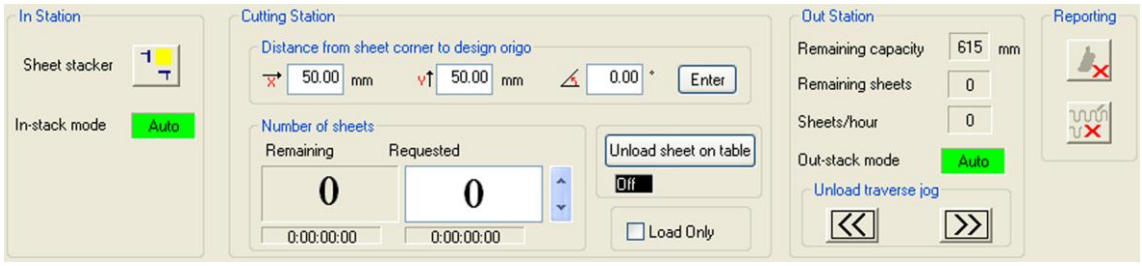


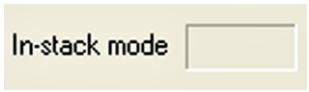
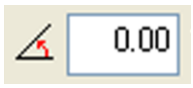
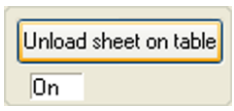
	Show job view in full screen. When in full screen display, the button face changes to this:
	Show job view in split screen.
	Enters zoom mode. The cursor changes to a magnifying glass. Select area to be zoomed.
	View design only.
	View design and selected board size.
	View design, selected board size and the table size.
	Enters the Job Setup dialog.
	Enter the **Step and Repeat** setup dialog.
	Rotate direction of flute (corrugated) or grain (folding carton).
	Rotate direction of flute (corrugated) or grain (folding carton).
	Enter ARS registration setup dialog. XP-Guide is running with ARS enabled.
	Enter ARS registration setup dialog. No ARS functions are enabled.
	Vacuum section selection

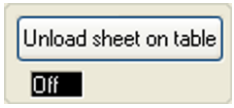
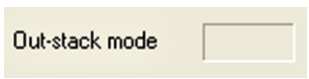
	Indicates that all designs are inside the working area.
	Indicates that one ore more designs are outside the working area.
	Automation options dialog
	Selects a **Job Setup** file from the drop down list.
	Selects **Board Size** from the drop down list.
	Select Reference Point from the drop down list.
	Number of copies for the **Step and Repeat** function.
	Select **Automation option** file from the drop down list
	Displays the mouse pointer position relative to the selected Reference Point.

12.8 Production control dialog

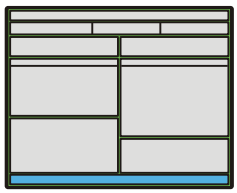




	Move stackers in. Use this when adjusting the position of the stackers.
	The switch position on the In-stack operation panel is displayed; Automatic or Manual.
	Specify the distance along X from the sheet edge to the reference point for the design.
	Specify the distance along Y from the sheet edge to the reference point for the design.
	If the sheet is rotated, specify the angle (in degrees). For simple angle calculation, see table in page (125).
	Push this button to enter the specified values.
	The remaining number of sheets to be processed in current job. The bottom number is a time estimate for the remaining job.
	Specify the number of sheets to be processed in current job. The number can be entered directly or by using the up/down arrows. The bottom number is a time estimate for the requested job.
	There is a sheet of material on the Cutting table, the load/unload sequence will start with unloading this sheet. Note: 1. Push the button to toggle on/off. 2. Sheet on table/No sheet on table is indicated also in the Job view window (224)

	There is no sheet on the cutting table, the load/unload sequence will start to load a new sheet.
	When selected, this function specifies a semi-automated operation mode: 1. Press *Start*. 2. A sheet is loaded from the In-stack and onto the cutting table. 3. The job is executed. 4. Manually remove the finished sheet from the Cutting table. 5. Repeat the sequence from (1).
	The remaining Out-stack capacity is displayed (mm or inch).
	The remaining Out-stack capacity is displayed as number of sheets.
	The average production speed for current job, displayed as sheets pr hour.
	The switch position on the Out-stack operation panel is displayed; Automatic or Manual.
	Push the buttons to jog the Unload traverse.
	Remote alert (144) is enabled. Push button to disable.
	Remote alert (144) is disabled. Push button to enable.
	Job report function (146) is enabled. Push button to disable.
	Job report function (146) is disabled. Push button to enable.

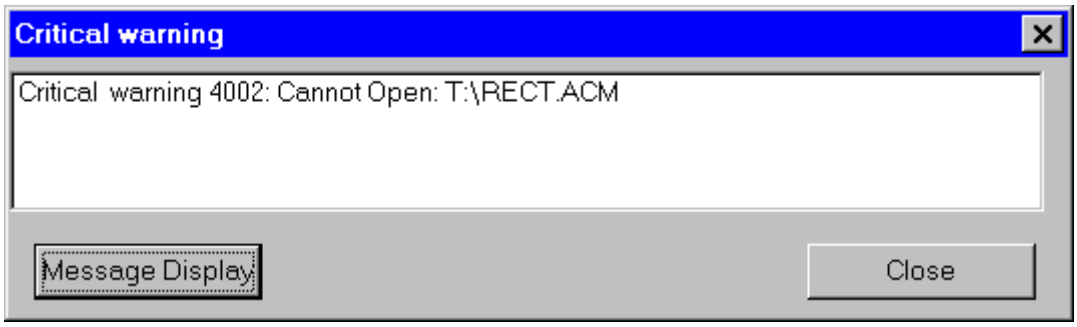
12.9 Status bar



The status bar at the bottom of the GUI shows brief descriptions of various functions in the GUI. The status bar can be toggled on and off from **Main Menu->View->Status bar**.

12.10 Critical Warning Display

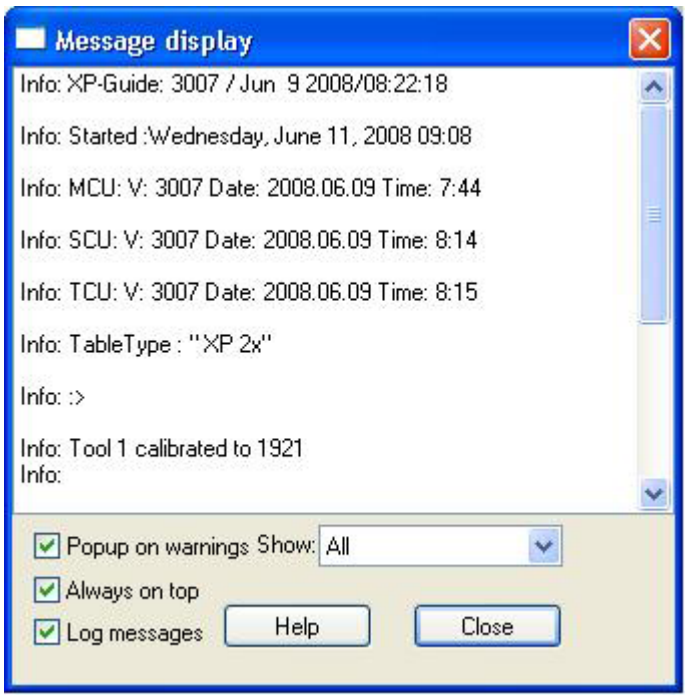
When a situation that requires an action from the operator occurs in the system, the following message box will be displayed:



Additional information may be achieved in the Message Display:

12.11 Message Display

The Message Display is available from the **Main Toolbar** button.



The Message display offers additional information when troubleshooting the system.
Normally you will get all the necessary information from the pop-up Critical Warning Display.

For additional information, please examine the **Message Display**.

Pop-up on warnings
Check this box if you want warnings to be automatically displayed.

Always on top
Check this box if you want the Message display to stay on top.

Log messages
The system is prepared for output of additional system information, useful for service and troubleshooting. For normal operation disable this function to reduce the amount of messages.

Show:
The type of information displayed in the Message display can be configured to:

1. Critical messages only
2. Critical and important messages
3. All messages.

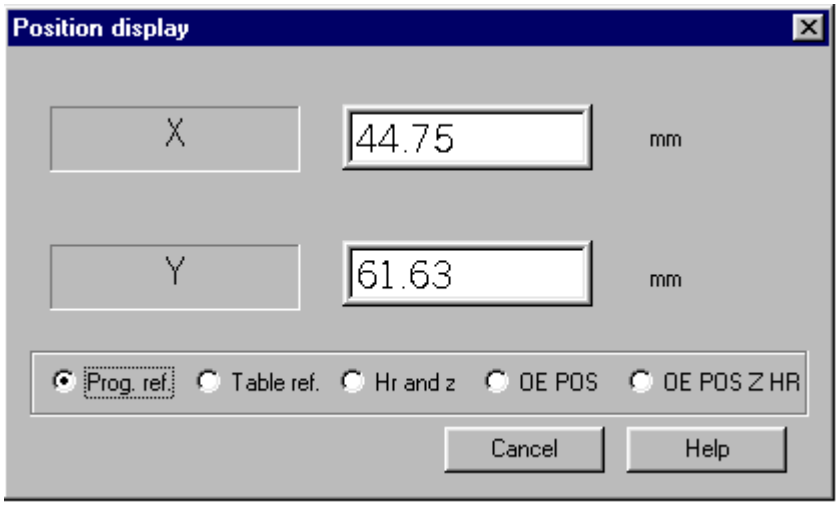
12.12 Position Display

The Position Display is available from:

- **Main Menu->View->Position display**
- **Ctrl + D**

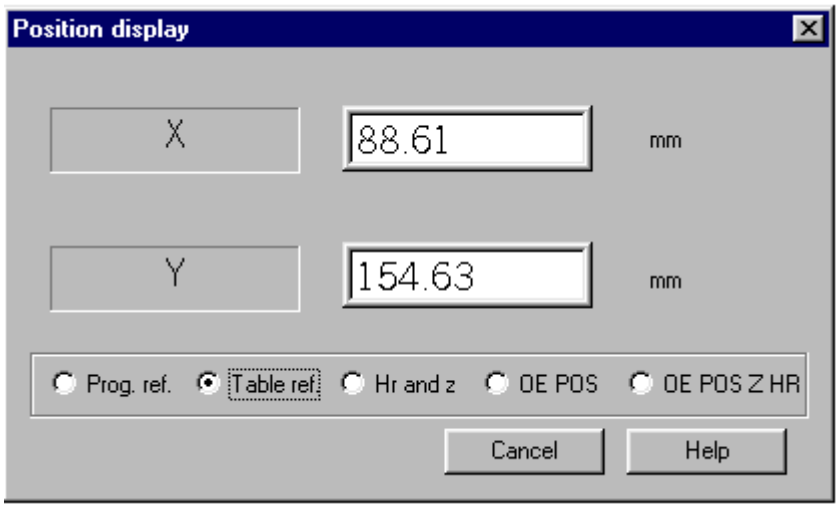
Use the set of radio-buttons to select one of the available displays:

12.12.1 Program reference



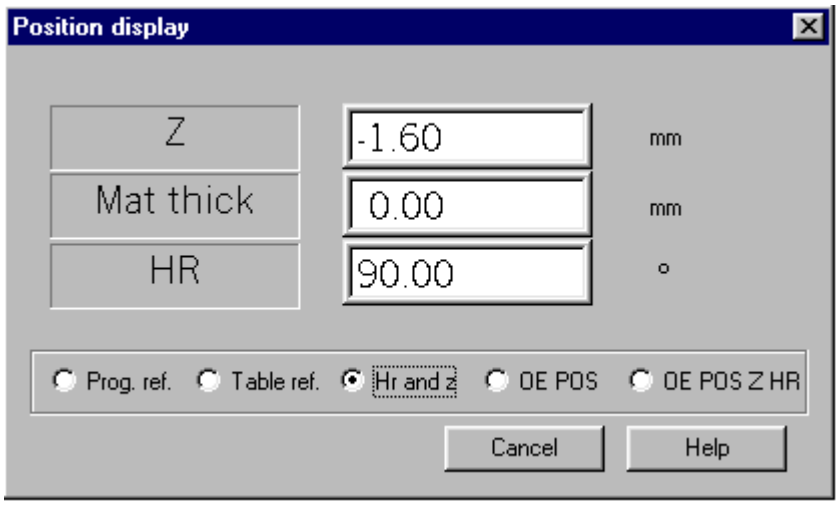
Displays table coordinates relative to program reference point

12.12.2 Table reference



Displays table coordinates relative to table reference point

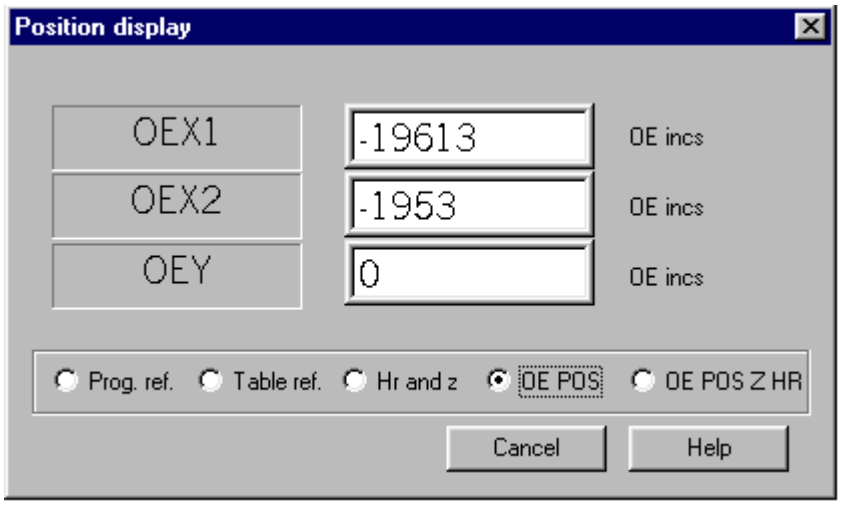
12.12.3 Tool Rotation, material thickness and Z - axis



Display Z and Tool Rotation positions.

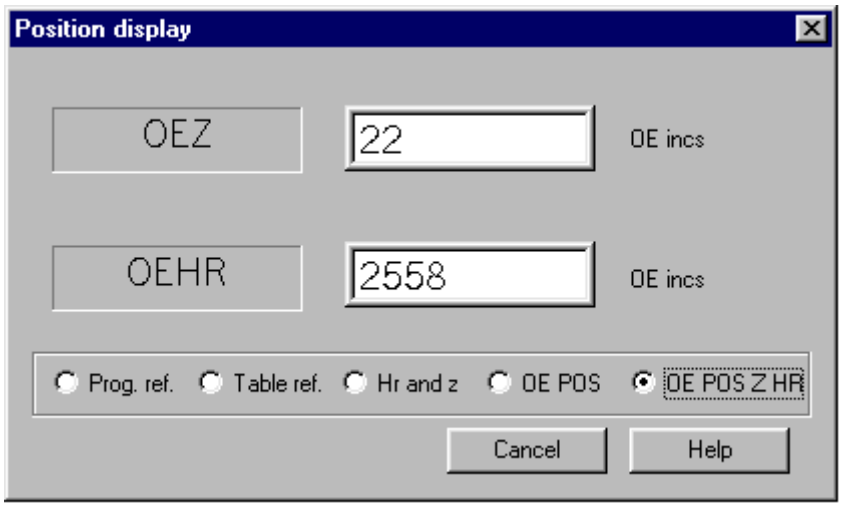
- Z shows actual distance from Z axis zero position
- Tool Rotation shows actual angle from Tool Rotation zero
- Material thickness shows measured thickness of material on the table
-

12.12.4 Encoder count, X and Y



Shows encoder input as read for X1, X2 and Y encoders

12.12.5 Encoder count, Z and Tool Rotation



Shows encoder input as read for Z and Tool rotation encoders

12.13 Accelerator Keys

Key	**Function**
Ctrl + B	Board Size setup
Ctrl + D	Position Display
Ctrl + F	Toggle Flute Direction
Ctrl + J	Edit Job Setup
Ctrl + O	Open Input File
Ctrl + P	Set ball point pen pressure (N/A)
Ctrl + S	Step And Repeat setup
Ctrl + T	Tool Configuration
F1	Help in active window
Ctrl + Alt + D	Memory dump
Ctrl + Alt + L	Servo Log
Ctrl + Alt + O	System Setup
Ctrl + E	Display axis force
Ctrl + Alt + K	Keyboard command entry

13. Appendix - Install software

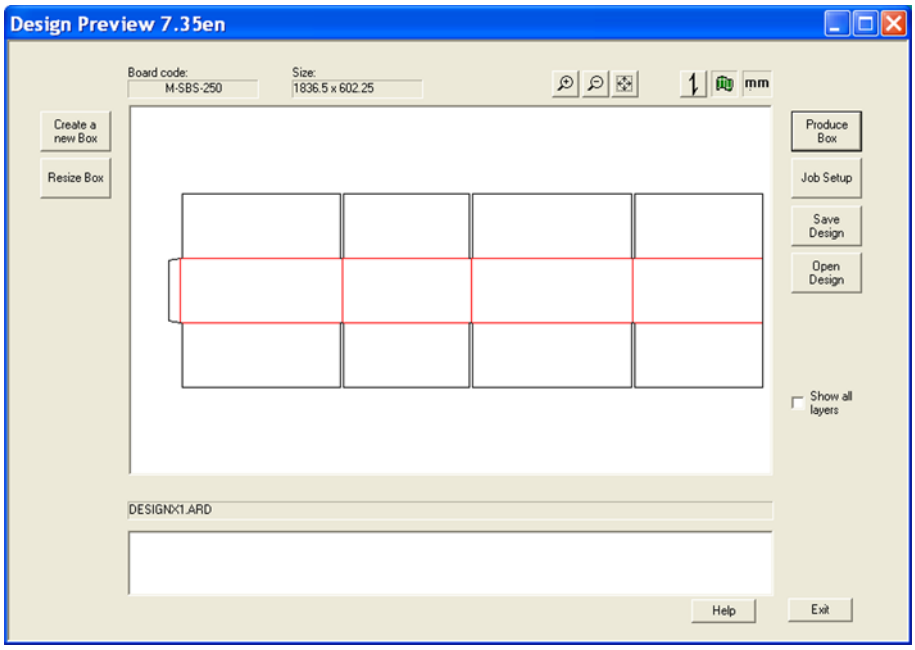
13.1 Install XP-Guide system software

A detailed description of the installation of XP-Guide is found in the installation manual 3140_InstallationMan_xpa_us available on the XP-Guide CD.

13.2 Install ARS software

For the ARS option to work properly, a Scorpion sw installation has to be completed. You will find a detailed description in the service guide for XP, 3188_ServiceGuide_XPA_ARS.pdf, available on the XP-Guide CD.

14. Appendix - CAD-X preview dialog



This dialog is used when importing DXF, CFF2 or DDES files and when opening ArtiosCAD designs (.ARD).
The dialog shows the design as read by CAD-X.
At the lower left there is a field showing operator messages.

14.1 Board code

Board code: M-SBS-250	Display the selected board code. Board code is a code used in the actual factory to identify the boards available.

14.2 Size

Size: 1836.5 x 602.25	Display the size of the design (X x Y) in selected units, mm or inch.

14.3 Zoom functions

	Zoom rectangle. Push the button. Use the mouse to select the preview area you want to see in the window.
	Zoom out. Push the button to expand the view.
	Scale to fit. Preview is scaled to fit the window.

14.4 Flute button

Display the flute or grain direction. Direction may be altered by pushing the button.

	Flute/Grain is along X.
	Flute/Grain is along Y.

14.5 Design side display

Show which side of a design that is displayed.

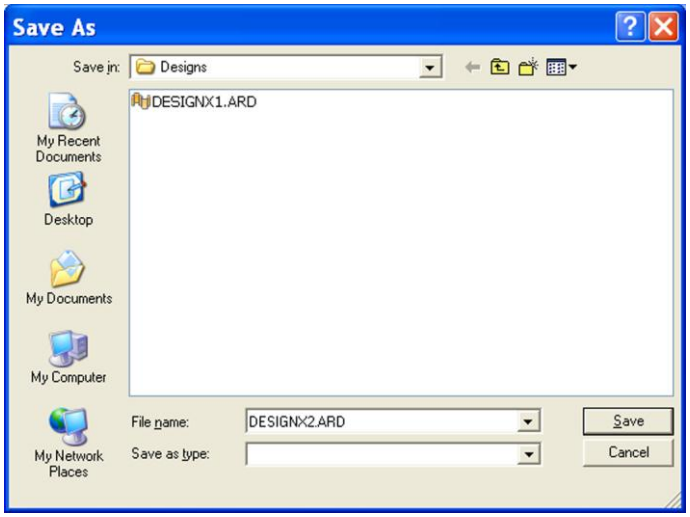
	Inside
	Outside

14.6 Unit display

Show the units used for the preview display.

	Inches
	mm

14.7 Produce box

Produce Box	Press the **Produce Box** button to create the cutting file and transfer it to XL-Guide. Before the CAD-X preview dialog is closed, you are asked to save current design:
	The recommended directory for design storage is: C:\esko\artios\designs. Give the design a name and press **Save**. After this, XL-Guide is displayed with the selected design displayed in **Job view**, ready to be cut.

14.8 Job setup

Job Setup	**Job setup** is opened for editing. For more information about **Job setup**, see XL-Guide Online Help.

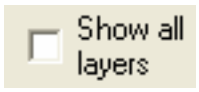
14.9 Save design

Save Design	Save current design (.ard). The recommended directory for design storage is: C:\esko\artios\designs.

14.10 Open design

Open Design	Open another design (.ard). Same as double-clicking an ard-file in XL-Guide File View.

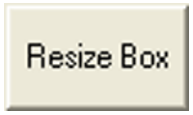
14.11 Show all layers

	Show all layers in a design. Inside ArtiosCAD, a design is separated into layers. One layer contains the geometry; one layer contains all dimensions and so on. Use this option to verify your settings.

14.12 Create a new box

	Start from the beginning, select and specify a new box.

14.13 Resize Box

	Enter dialog for modification of box parameters.

14.14 Exit

Close this dialog.

15. Appendix - Zefiro 75, vacuum cleaner

15.1 Introduction

1 – Filter chamber
2 – Filter shaking lever
3 – Removable material container

Note:
Carefully observe the vacuum cleaner filling level.
If the vacuum cleaner container is filled up completely, the dust removal function will stop with a high risk for HSMU/HPMU motor damage.

15.2 Filter shaking

Filter shaking is important in order to maintain a good vacuum cleaner performance.

Filter shaking is best operated every time before use and after prolonged operation.

Note: This operation must be performed only when the vacuum cleaner is switched off and the motor has stopped.

15.3 Remove material container

>

>>

Note:

You can use the container with or without plastic bags.

Detailed information about how to operate the vacuum cleaner is available in the Zefiro 75 Operators and maintenance manual.

16. Appendix – High capacity vacuum cleaner, Depureco

16.1 Introduction

1 – Filter Chamber
2 – Filter Shaking Lever
3 – Removable Material Container

Note:
Carefully observe the Vacuum Cleaner filling level.
If the Vacuum Cleaner container is filled up completely, the dust removal function will stop with a high risk for Spindle Motor damage.

16.2 Filter shaking

Filter Shaking is important in order to maintain a good Vacuum Cleaner performance.
Filter Shaking is best operated every time before use and after prolonged operation.

Note: This operation must be performed only when the Vacuum Cleaner is switched off and the motor has stopped.

16.3 Remove Material Container

Note: You can use the container with or without Plastic Bag.

16.4 Use Plastic Bag in Material Container

Shake the filter well before emptying the container.

Fix the Plastic Bag to the steel bar.

Plastic Bag with bar ready for container.

Fold/fix the Plastic Bag around the container.
Container with Plastic Bag ready for operation.

Detailed information about how to operate the Vacuum Cleaner is available in the Operators and maintenance manual.